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ABSTRACT

This individualized, competency-based study guide is designed to assist teacher-coordinators supervising cooperative education programs for plumber's helpers in providing students with general information for immediate reinforcement on the job and developing an understanding of the job prior to employment. A progress chart is provided to allow the instructor to pinpoint student progress. Contents include study guide objectives, suggested teaching procedures for the coordinator, answers to assignment sheets, answers to test, eight information sheets, and eight assignment sheets. Topics covered are occupational introduction; safety; tool and equipment safety; fire safety; steel and copper pipe and fittings; plastic pipe and fittings; drain, waste, and vent lines; and fixtures and valves. An eight-part test is provided at the end of the study guide. (YLB)

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INDIVIDUALIZED STUDY GUIDE

ED258020

# PLUMBER'S HELPER

## Coordinator's Guide

*Prepared by Charles R. Traylor*

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PLUMBER'S HELPER

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## FOREWORD

This individualized study guide has been developed for the student who is enrolled in Cooperative Part-time Training and who is employed or desires to be employed as a plumber's helper. The study material is designed to provide the student with general information for immediate reinforcement on the job and to develop an understanding of the job prior to employment.

Even though these study guides are individualized, the coordinator should closely supervise each student's studies. To allow the coordinator to better direct the learning activities, both coordinator guides and student manuals are available. A progress chart provided in each student manual will allow the coordinator to pinpoint the progress a student has made toward each objective in the sequence in which they are completed.

Appreciation is expressed to those whose expertise made possible the development of these study guides. The assistance of these individuals in the development process assures that the materials are current and of use to vocational teachers in Texas. The following people provided valuable assistance in the developmental process:

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Lee Henderson, Instructor, H. Grady Spruce H.S., Dallas, TX
Travis Davis, Instructor, Skyline H.S., Dallas, TX

Special recognition must be given to Charles "Randy" Traylor, Principal, Hughes Springs High School who, as a Curriculum Specialist with the Occupational Curriculum Laboratory, developed this material. Mention should also be made of the support staff of the OCL who contribute so much to the development of each publication.

Bill Barnes, Ph.D., Director
Occupational Curriculum Laboratory

Progress Chart for

# Plumber's Helper

Name _____

School _____

| | | Date Completed |
|---|---|---|
| INFORMATION SHEET 1 | OCCUPATIONAL INTRODUCTION | |
| ASSIGNMENT SHEET 1 | OCCUPATIONAL INTRODUCTION | |
| Test | Part 1 | |
| **OBJECTIVE** | Discuss briefly a complete overview of the plumbing industry, explain the need for plumbers and sanitary plumbing, discuss entrepreneurship and how it affects the plumbing industry, identify job opportunities related to the plumbing field. | |
| INFORMATION SHEET 2 | SAFETY | |
| ASSIGNMENT SHEET 2 | SELECTING SAFETY ATTITUDES | |
| Test | Part 2 | |
| **OBJECTIVE** | Identify the correct safety practices to be followed at the training station. | |
| INFORMATION SHEET 3 | TOOL AND EQUIPMENT SAFETY | |
| ASSIGNMENT SHEET 3 | SAFETY | |
| Test | Part 3 | |
| **OBJECTIVE** | Identify the correct safety practices to be followed using hand tools and power tools. | |
| INFORMATION SHEET 4 | FIRE SAFETY | |
| ASSIGNMENT SHEET 4 | FIRE SAFETY | |
| Test | Part 4 | |
| **OBJECTIVE** | Discuss fire safety pertaining to your school and training station. | |
| INFORMATION SHEET 5 | STEEL AND COPPER PIPE AND FITTINGS | |
| ASSIGNMENT SHEET 5 | STEEL AND COPPER PIPE AND FITTINGS | |

| | | |
|---|---|---|
| Test | Part 5 | |
| **OBJECTIVE** | Discuss how steel and copper pipe and fittings are used in the plumbing industry, identify the tools necessary to install steel and copper pipe and fittings. | |
| INFORMATION SHEET 6 | PLASTIC PIPE AND FITTINGS | |
| ASSIGNMENT SHEET 6 | PLASTIC PIPE AND FITTINGS | |
| Test | Part 6 | |
| **OBJECTIVE** | Discuss how plastic pipe and fittings are used in the plumbing industry, identify plastic pipe fittings. | |
| INFORMATION SHEET 7 | DRAIN, WASTE AND VENT LINES | |
| ASSIGNMENT SHEET 7 | DRAIN, WASTE AND VENT LINES | |
| Test | Part 7 | |
| **OBJECTIVE** | Discuss the use and proper installation of drain, waste, and vent lines, identify cast iron fitting. | |
| INFORMATION SHEET 8 | FIXTURES AND VALVES | |
| ASSIGNMENT SHEET 8 | FIXTURES AND VALVES | |
| Test | Part 8 | |
| **OBJECTIVE** | Explain the meaning of the term "fixture," identify the materials from which fixtures are made, discuss the proper installation of a sink, lavatory, faucet, drain, and bathtub, explain the use of a valve, identify different kinds of valves and their uses. | |

This student has completed the indicated training under my supervision.

_____

Teacher

# PLUMBER'S HELPER

## STUDY GUIDE OBJECTIVE

After completion of this study guide, the student will be able to perform the procedures and responsibilities required of a plumber's helper. This knowledge will be evidenced through demonstration and by satisfactorily completing the test.

## SPECIFIC OBJECTIVES

In completing this study guide, the student will:

1. Discuss briefly a complete overview of the plumbing industry
2. Explain the need for plumbers and sanitary plumbing
3. Discuss entrepreneurship and how it affects the plumbing industry
4. Identify job opportunities related to the plumbing field
5. Identify the correct safety practices to be followed at the training station
6. Identify the correct safety practices to be followed using hand tools and power tools
7. Discuss fire safety pertaining to your school and training station
8. Discuss how steel and copper pipe and fittings are used in the plumbing industry
9. Identify the tools necessary to install steel and copper pipe and fittings
10. Discuss how plastic pipe and fittings are used in the plumbing industry
11. Identify plastic pipe fittings
12. Discuss the use and proper installation of drain, waste, and vent lines
13. Identify cast iron fitting
14. Explain the meaning of the term "fixture"
15. Identify the materials from which fixtures are made
16. Discuss the proper installation of a sink, lavatory, faucet, drain, and bathtub
17. Explain the use of a valve
18. Identify different kinds of valves and their uses

## SUGGESTED TEACHING PROCEDURES FOR THE COORDINATOR

I. Objective Sheet

A. Discuss each objective with the student.

B. Explain the relationship of each objective to the student's training station.

C. Have the student complete the objectives in the most logical sequence for the training station.

(NOTE: A change of sequence is necessary only if a student changes jobs during the year or an employer requests training in a specific area.)

D. Add any objectives necessary for the training station.

II. Information and Assignment Sheets

A. INFORMATION SHEET 1--OCCUPATIONAL INTRODUCTION

1. The first part of this Information Sheet may be used to give an overview of plumbing.

2. Discuss each term in detail.

3. Discuss each definition in detail.

4. Discuss small business and entrepreneurship.

5. Use ASSIGNMENT SHEET 1--OCCUPATIONAL INTRODUCTION to reinforce this area of information.

B. INFORMATION SHEET 2--SAFETY

1. Discuss each safety rule in detail.

2. Add any safety rules that fit your particular situation.

3. Secure safety posters and films for class use.

4. Have the training sponsor explain safety rules and their importance to the business operation.

5. Use ASSIGNMENT SHEET 2--SAFETY to reinforce this area of information.

C. INFORMATION SHEET 3--TOOL AND EQUIPMENT SAFETY

1. This Information Sheet may be used to help the student to identify the common tools and equipment to be used and the proper care and use of these tools and equipment.

2. Have the student discuss tool and equipment safety with his/her training sponsor. Have the student list the responsibilities required by the training sponsor pertaining to tool and equipment safety.

3. Use ASSIGNMENT SHEET 3--TOOL AND EQUIPMENT SAFETY to reinforce this area of information.

D. INFORMATION SHEET 4--FIRE SAFETY

1. This Information Sheet may be used to help the student to identify and prevent common fire hazards.

2. Have the student to identify the types of fire extinguishers used at the training stations.

3. If more than one type of extinguisher is used at the training station, have the student identify the different uses of these extinguishers.

4. Have the student draw an evacuation plan in case of fire in the classroom.

5. Use ASSIGNMENT SHEET 4--FIRE SAFETY to reinforce this area of information.

E. INFORMATION SHEET 5--STEEL AND COPPER PIPE AND FITTINGS

1. This Information Sheet may be used to help the student identify steel and copper pipe and fittings.

2. This Information Sheet may be used to help the student become familiar with terms and definitions associated with steel and copper pipe and fittings.

3. This Information Sheet may be used to identify tools used in working with steel and copper pipe and fittings.

4. Use ASSIGNMENT SHEET 5--STEEL AND COPPER PIPE AND FITTINGS to reinforce this area of instruction.

F. INFORMATION SHEET 6--PLASTIC PIPE AND FITTINGS

1. This Information Sheet may be used to help the student to identify plastic pipe and fittings.

2. Discuss each term in detail.

3. Discuss each definition in detail

4. Use ASSIGNMENT SHEET 6--PLASTIC PIPE AND FITTINGS to reinforce this area of information.

G. INFORMATION SHEET 7--DRAIN, WASTE, AND VENT LINES

1. This Information Sheet may be used to help the student to identify drain, waste, and vent lines.

2. Discuss each term in detail.

3. Discuss each definition in detail.

4. Identify cast iron fittings used in drains, waste, and vent lines.

5. Use ASSIGNMENT SHEET 7--DRAIN, WASTE, AND VENT LINES to reinforce this area of information.

H. INFORMATION SHEET 8--FIXTURES AND VALVES

1. This information may be used to help the student to identify fixtures and valves.

2. Discuss each term in detail.

3. Discuss each definition in detail.

4. Utilize Illustration Sheets to emphasize details.

5. Have student list fixtures and valves used at the training station.

6. Use ASSIGNMENT SHEET 8--FIXTURES AND VALVES to reinforce the information in this area.

## ANSWERS TO ASSIGNMENT SHEETS

### ASSIGNMENT SHEET 1

A.
1. e
2. c
3. a
4. b
5. d
6. f
7. g

B.
1. apprentice plumber
2. master plumber
3. license
4. sales person/counterperson
5. estimator
6. foreman

C.
1. A plumber communicates with customers.
2. A plumber repairs and replaces broken plumbing.
3. A plumber installs new plumbing.
4. A plumber works for a company.
5. A plumber installs plumbing in a safe and sanitary manner.

D.
1. Entrepreneurship
2. Entrepreneur

E.
1. What kinds of jobs to take
2. When to go to work and when to stop
3. Who will be hired to help in the business
4. Who will be fired when there is not much work

F. home businesses

### ASSIGNMENT SHEET 2

1. T
2. F
3. F
4. T
5. T
6. F
7. F
8. T
9. F
10. F
11. F
12. T
13. T
14. T
15. F
16. T
17. F
18. T
19. F
20. T

### ASSIGNMENT SHEET 3

A.
1. full attention
2. repaired
3. wooden
4. with a hard-faced hammer
5. best condition
6. cutting edge; point
7. sharp-edged
8. cut
9. place
10. right
11. properly
12. ground smooth

B.
1.
2.
3. ✓
4. ✓
5. ✓
6.
7. ✓
8. ✓
9.
10. ✓
11.
12. ✓

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ASSIGNMENT SHEET 4

A.
1. ✓
2.
3.
4. ✓
5.
6. ✓
7.
8. ✓
9. ✓
10.

B.
1. Class B
2. Class A
3. Class C

C.
1. Class A or B
2. Class B or C
3. Class A
4. Class A
5. Class A, B, or C

D. Answers should closely approximate the following thoughts and may be in any order.

1. Close doors and windows as you leave the building.
2. Make sure all the people are out of the building as you leave.
3. Leave the building in a safe manner, going out windows only when necessary.
4. Know beforehand the best route to take when leaving the building.
5. Get away from the building when you are outside.

E.

| Appearance of the Skin | Treatment |
|---|---|
| A. Charred or seared skin | Get immediate medical help |
| B. Blistered skin | Apply cold water and sterile gauze |
| C. Reddened skin | Apply cold water |

ASSIGNMENT SHEET 5

A.
1. d
2. a
3. c
4. b
5. e
6. h
7. i
8. f
9. g

B.
1. ✓
2.
3. ✓
4. ✓

C.
1. ✓
2.
3. ✓
4.
5. ✓

D.
1. 90° elbow
2. Tee
3. Union
4. Cap
5. coupling
6. cross
7. plug
8. reducer

E.
1. end-to-end
2. center-to-center
3. end-to-center

F.
1. T
2. T
3. F
4. T

G. Tools--any three of these:

1. hacksaw
2. pipe cutter
3. pipe vise
4. (ratchet) threader
5. pipe reamer
6. pipe wrench



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Materials--any three of these:

1. thread cutting oil
2. thread sealing compound
3. steel pipe
4. steel fitting

H. 1. ✓
2. ✓
3. ✓
4.
5.

I. 1. T
2. T
3. T
4. F

J. 1. propane torch
2. tubing bender
3. tubing cutter
4. flaring tool

K. Any six of the following:

1. handsaw
2. keyhole saw
3. circular saw
4. cold chisel
5. wood chisel
6. folding rule
7. claw hammer
8. drain spade
9. adjustable wrench
10. pipe jaw pliers

ASSIGNMENT SHEET 6

A. a. 7
b. 5
c. 6
d. 9
e. 3
f. 10
g. 2
h. 4
i. 8
j. 1

B. 1. PVC 160 or PVC 200
2. PVC schedule 40
3. CPVC
4. flexible plastic pipe

C. 1. T
2. F
3. T
4. F
5. T

D. 1. ✓
2.
3. ✓
4. ✓
5.
6.

E. 1.
2. ✓
3
4. ✓

ASSIGNMENT SHEET 7

A. a. 3
b. 6
c. 2
d. 4
e. 1
f. 5
g. 7
h. 8

B. 1. ✓
2.
3.
4. ✓
5. ✓

C. 1. T
2. F
3. F
4. F
5. T
6. F

D. 1. ✓
2.
3. ✓
4. ✓
5.
6.

ASSIGNMENT SHEET 8

A. a. 3
b. 1
c. 8
d. 2
e. 7
f. 6
g. 5
h. 10
i. 4
j. 9

B. 1. ✓
2.
3. ✓
4. ✓
5.

C. 1.
2. ✓
3. ✓
4.
5. ✓

D. 1. universal
2. china fixture
3. steel and cast iron

E. 1. ✓
2. ✓
3. ✓
4. ✓
5. ✓

F. 1. ✓
2. ✓
3.
4. ✓

G. Any three of these:

1. gate
2. globe
3. compression
4. ball
5. check
6. stop and waste
7. tube connector
8. gas stop

H. Any three of these:

1. hose bibb
2. plain bibb
3. sill cock
4. boiler cock
5. special sill cock

I. 1. water closet
2. angle tub
3. drain
4. hose bibb
5. shower stall
6. lavatory
7. roll rim tub
8. water heater

# PLUMBER'S HELPER

## ANSWERS TO TEST

PART 1

A. 1. b
2. a
3. f
4. c
5. d
6. e
7. g
8. h

B. 1. An estimator is a person who develops the cost of a plumbing job.

2. A master plumber is a person with a master plumber's license. This person (usually licensed by the state) is legally able to contract with a customer.

3. An apprentice plumber is a person learning the plumbing trade. He/she works for a licensed plumber or can go to school to be a plumber.

4. A counterperson is a salesclerk in a wholesale plumbing supply business.

5. A salesperson is a salesclerk in a retail plumbing supply business.

6. A foreman is a person in charge of a plumbing area.

C. A license is a paper, card, etc., showing a person can legally do something.

D. 1. ✓
2. ✓
3. ✓
4. ✓

E. Entrepreneurship means self-employment.

F. An entrepreneur is a person who begins his/her own business.

PART 2

1. a. (2)
b. (2), (3)
c. (1), (2), (3), (5), (6), (7)

2. a. ✓
b.
c. ✓
d.

3. a. (2)
b. (3)
c. (1)
d. (3)
e. (3)
f. (2)

ANSWERS TO ASSIGNMENTS

4. a. F
   b. T
   c. F
   d. F
   e. T
   f. F
   g. T
   h. F
   i. F
   j. T
   k. T
   l. F
   m. F
   n. T
   o. T
   p. T
   q. F

PART 3

1. a. ✓
   b. ✓
   c. ✓
   d. ✓
   e. ✓
   f.
   g. ✓
   h. ✓
   i. ✓
   j.
   k. ✓
   l. ✓

2. a. F
   b. T
   c. T
   d. T
   e. T
   f. F
   g. T
   h. T
   i. T
   j. F
   k. F
   l. F
   m. T
   n. F
   o. T
   p. F
   q. T
   r. T
   s. T

PART 4

1. a. T
   b. F
   c. F
   d. T
   e. F
   f. T
   g. F
   h. T
   i. T
   j. F

2. a. 2
   b. 1
   c. 3

3. a. A or B - Turn upside down - Over the fire
   b. B or C - Squeeze handle - At base of fire
   c. A - Turn upside down - At base of fire
   d. A - Squeeze handle - At base of fire
   e. A, B, or C - Squeeze handle - At base of fire

4. a. F
   b. T
   c. F
   d. T
   e. F

5. a. Third degree.....Charred or seared skin.....Get immediate medical help
   b. Second degree.....Blistered skin.....Apply cold water and sterile gauze
   c. First degree.....Reddened skin.....Apply cold water

PART 5

1. a. 2
   b. 4
   c. 3
   d. 1

e. 5
f. 8
g. 9
h. 6
i. 7

2. a. ✓
b.
c. ✓
d. ✓

3. a. ✓
b.
c. ✓
d.
e. ✓

4. a. 90° elbow
b. Tee
c. Union
d. Cap
e. Coupling
f. Cross
g. Plug
h. Reducer

5. a. End-to-end
b. End-to-center
c. Center-to-center

6. a. ✓
b. ✓
c.
d. ✓

7. Any three of these:

a. Hacksaw
b. Pipe cutter
c. Pipe vise
d. Ratchet threader or threader
e. Pipe reamer
f. Pipe wrench
g. Thread cutting oil
h. Thread sealing compound

8. a. ✓
b. ✓
c. ✓
d.
e.

9. a. ✓
b. ✓
c.
d. ✓

10. a. Propane torch
b. Tubing bender

c. Tubing cutter
d. Flaring tool

11. Any three of these:

a. Handsaw
b. Keyhole saw
c. Circular saw
d. Cold chisel
e. Wood chisel
f. Folding rule
g. Claw hammer
h. Drain spade
i. Adjustable wrench
j. Pipe jaw pliers

PART 6

1. a. 10
b. 7
c. 5
d. 8
e. 2
f. 3
g. 1
h. 9
i. 4
j. 6

2. a. PVC 160 or PVC 200
b. PVC schedule 40
c. CPVC
d. Flexible plastic pipe

3. a. ✓
b.
c. ✓
d.
e. ✓

4. a. ✓
b. ✓
c.
d. ✓

5. a.
b. ✓
c.
d. ✓

PART 7

1. a. 3
b. 5
c. 1
d. 4
e. 6
f. 2
g. 7
h. 8

2. Any four of these:

a. Cast iron
b. Clay
c. Plastic
d. Galvanized steel
e. Copper

3. a. ✓
b.
c.
d. ✓
e. ✓
f. ✓

4. a. Oakum
b. Cement

5. a. ✓
b.
c. ✓
d.
e.

6. a. ✓
b. ✓

7. a. 90° bend
   b. Sanitary tee
   c. Return bend
   d. P-trap

8. Any five of these seven:

   a. Melting pot and ladle
   b. Burner
   c. Hacksaw
   d. Cold chisel
   e. Hammer
   f. Yarning iron
   g. Offset caulking iron

PART 8

1. a. 3
   b. 1
   c. 8
   d. 2
   e. 7
   f. 6
   g. 5
   h. 10
   i. 4
   j. 9

2. a. ✓
   b.
   c. ✓
   d. ✓
   e.

3. a.
   b. ✓
   c. ✓
   d.
   e. ✓

4. a. universal
   b. china fixture
   c. steel and cast iron

5. a. ✓
   b. ✓
   c. ✓
   d. ✓
   e. ✓

6. a. ✓
   b. ✓
   c.
   d. ✓

7. Any three of these:

   a. gate
   b. globe
   c. compression
   d. ball
   e. check
   f. stop and waste
   g. tube connector
   h. gas stop

8. Any three of these:

   a. hose bibb
   b. plain bibb
   c. sill cock
   d. boiler cock
   e. special sill cock

9. a. water closet
   b. angle tub
   c. drain
   d. hose bibb
   e. shower stall
   f. lavatory
   g. roll rim tub
   h. water heater

PLUMBER'S HELPER

INFORMATION SHEET 1--OCCUPATIONAL INTRODUCTION

I. Terms and Definitions

A. Plumber--a person who installs, repairs, or replaces plumbing pipes, fittings, and fixtures which are used in the movement of water, gas, and waste

B. Apprentice plumber--a person learning the plumbing trade who works for a licensed plumber; he/she may go to school to learn to be a plumber

C. Journeyman plumber--a person who works for a master plumber; usually has a journeyman's license (licensed by the state)

D. Master plumber (plumbing contractor)--a person with a master plumber's license (usually state licensed); legally able to contract with a customer

E. Contractor--a person who agrees to do a job for another person

F. Contract--a fixing of terms between two or more people

G. Legally--allowed by law

H. License--a paper, card, etc. showing a person can legally do something

I. Fixture--any fitting attached to a building (bathroom fixture, kitchen fixture)

J. Fitting--part used to join or adapt other parts, as on pipes (ell, tee, coupling, etc.)

II. Important Dates in Plumbing History

A. 1700--first apprentice plumber laws passed

B. 1855--first modern waste system in U.S. in Chicago

C. 1937--national apprentice plumber law passed

III. Duties of a Plumber

A. Communicate with customers

B. Repair or replace broken plumbing

C. Install new plumbing

D. Install plumbing in a safe and sanitary manner

E. Work for a company

1. A plumber may work in a plumbing company.

2. A plumber may work for him/herself.

   a. Working for oneself is called entrepreneurship.

   b. Entrepreneurship means self-employment.

   c. A person who begins his/her own business is an entrepreneur.

IV. Entrepreneurship (self-employment)

A. Entrepreneurs

1. One or more people who start a new business

2. Get the money to start a new business

3. Keep a new business going

4. Need to make decisions about how the company will be run

   a. What kinds of jobs to take

   b. When to go to work and when to stop

   c. Who will be hired to help in the business

   d. Who will be dismissed when there is not much work

B. Small business

1. About 95% of the businesses in the U.S. are owned by people who are self-employed.

2. Many small businesses are started every year.

3. Small businesses are sometimes called home businesses.

4. Home businesses have 45% of all the sales in the U.S.

5. Small employers hire 50% of the workers in the U.S.

6. Small businesses help start 60% of all new jobs.

7. Small businesses help to start new products.

V. Jobs Related to Plumbing

A. Salesperson--a salesclerk in a retail plumbing supply business

B. Counterperson--salesclerk in a wholesale plumbing supply business

C. Estimator--a person who develops the cost of a plumbing job

D. Inspector--a person who checks the plumbing work to see if it conforms to the plumbing code

E. Foreman--a person in charge of a plumbing crew

VI. Reasons Plumbers Are Needed

A. Growing economy in the construction field

B. Little automation in the construction field

C. Customer demands

D. Service and repair work

ASSIGNMENT SHEET 1--OCCUPATIONAL INTRODUCTION

A. Match each term with its definition by placing the correct letter in the spaces below.

_____ 1. A person who installs, repairs, or replaces plumbing pipes, fittings, and fixtures

_____ 2. A person who works for a master plumber

_____ 3. A person who agrees to do a job for another person

_____ 4. Any fitting attached to a building (bathroom fixture, kitchen fixture)

_____ 5. Part used to join or adapt other parts, as on pipes (ell, tee, coupling, etc.)

_____ 6. Self-employment

_____ 7. A person who checks the plumbing work to see if it conforms to the plumbing code

_____ 8. A person in charge of a plumbing crew

a. Contractor
b. Fixture
c. Journeyman plumber
d. Fitting
e. Plumber
f. Entrepreneurship
g. Inspector
h. Foreman

B. Fill in each blank with the right word from the list below.

Estimator
License
Master plumber
Foreman
Apprentice plumber
Counterperson
Salesperson

1. An _____ _____ is learning the plumbing trade.

2. A _____ _____ is legally able to contract with a customer.

3. A _____ is a card, paper, etc. showing that a person can legally do something.

4. A _____ is a salesclerk in a retail plumbing supply business and a _____ is a salesclerk in a wholesale plumbing supply business.

5. An _____ develops the cost of a plumbing job.

6. A _____ is a person in charge of a plumbing crew.

ASSIGNMENT

C. What are five duties of a plumber?

1.

2.

3.

4.

5.

D. 1. Working for oneself is called _____.

2. A person who begins his/her own business is an _____.

E. Name four of the decisions an entrepreneur must make.

1.

2.

3.

4.

F. Small businesses are sometimes called _____ _____.

PLUMBER'S HELPER

INFORMATION SHEET 2--SAFETY

I. Explanation of Safety

A. Safety is being careful so that you are not injured or cause an accident.

B. OSHA--Occupational Safety and Health Act

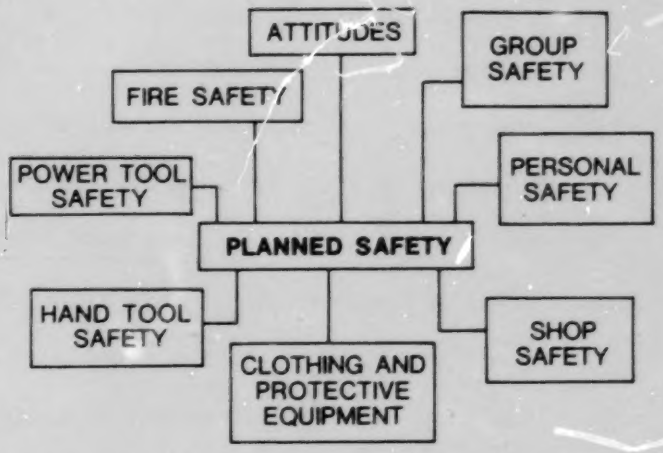
1. Began in 1970

2. The law assures every working man or woman in the nation safe and healthful working conditions and the safekeeping of our human resources.

3. The law also organized accident-prevention programs in the school shops.

C. General safety includes:

1. Attitudes
2. Personal safety
3. Group safety
4. Job safety
5. Clothing and personal safety
6. Hand tool safety
7. Power tool safety
8. Fire safety




II. Safety Attitude

A. The proper safety attitude is a must when working with hazardous equipment.

B. Most accidents are usually caused by thoughtlessness and carelessness.

C. Every student must be on guard against accidents at <u>all</u> times and follow all safety rules.

III. Personal Safety

A. Dress properly. Do not wear loose clothes. Wear clothing that is correct for the job.

B. Wear a cap when working around moving parts to keep hair from getting caught in machinery.

C. Wear proper eye protection at all times.

D. Roll up long sleeves to above your elbows.

E. Wear hard toe shoes when working around equipment or with heavy material.

F. Ask questions if in doubt about how to do a job in a safe manner.

G. Wear special protective clothing when working with chemicals, insecticides, or other harmful chemicals.

H. Wear gloves when welding or working around sharp-edged metal to avoid burns and cuts.

I. Do not wear gloves around machinery and rotating parts.

J. Tell others if you see them doing something incorrectly or without proper safety equipment.

IV. Shop Safety

A. Do not horseplay at your training station.

B. Keep your work clean and neat.

C. Observe all posted safety rules.

D. Do not operate equipment without permission.

E. Report all injuries at once, even if they seem small.

F. Know the location of all fire extinguishers and exits.

G. Remove rings, watches, and other jewelry before working.

H. Keep oily rags in a closed metal container and empty container on a regular basis.

I. Wipe up spilled oil, grease, or other slippery substances from the floor.

J. Keep paint, thinners, and other flammable materials in a metal cabinet.

K. Do not run; running is very dangerous.

L. Keep all machines and tools clean and in good working order.

M. Do not use compressed air to clean machines of metal chips and cutting oil.

N. Get help when moving heavy objects.

O. Have adequate ventilation for jobs where fumes and dust are a hazard.

P. Never operate a machine until all safeguards are in place.

Q. Be alert at all times. Do not take chances.

R. Immediately report all breakage or damage to equipment to the training sponsor.

S. Return tools to storage areas when the tools are not in use.

T. Safety rules are posted on the machines for anyone who uses that machine.

PLUMBER'S HELPER

ASSIGNMENT SHEET 2--SELECTING SAFETY ATTITUDES

Directions: Select proper attitudes by answering T for True or F for False in the space provided at the left of each statement.

_____ 1. The reason someone usually gets hurt is due to thoughtlessness and carelessness.

_____ 2. Safety applies only when you are operating machinery.

_____ 3. Learning the skill is more important than learning safety on the job.

_____ 4. Injuries should be reported at once.

_____ 5. Accidents don't happen; they are usually caused by thoughtlessness and carelessness.

_____ 6. It is all right to break small minor safety rules if you are careful.

_____ 7. When lifting heavy objects, it is always best to lift with your back.

_____ 8. Goals for safety should include clean work areas, use of safegards, and following safety rules.

_____ 9. Hand tools are safe and can't cause injuries.

_____ 10. Horseplay is allowed if you are careful.

_____ 11. Running at the training station is permitted only if you are in a hurry.

_____ 12. Ask questions if in doubt about how to do a job in a safe manner.

_____ 13. Protect your eyes at all times.

_____ 14. Wear the clothing that is correct for the job.

_____ 15. You can operate machines when you feel like it.

_____ 16. Safety includes proper clean-up and equipment maintenance.

_____ 17. It is not your responsibility to clean up oil spills that were made by others.

_____ 18. You should tell others if you see them doing something incorrectly or without the proper safety equipment.

_____ 19. Safety glasses should be worn only when you know there are possible eye hazards.

_____ 20. Safety rules posted on machines are for anyone that uses that machine.

## INFORMATION SHEET 3--TOOL AND EQUIPMENT SAFETY

I. Hand Tool Safety

A. Always focus your full attention on the work.

B. Use the right tool for the right job.

C. Learn how to use the tool properly.

D. Keep tools clean and repaired.

E. Keep each tool in its place.

F. When using sharp-edged tools, cut away from your body.

G. Keep sharp-edged tools away from the edge of a bench or work area.

H. Carry sharp-pointed tools with the cutting edge or point down.

I. Keep tools repaired and clean.

J. All files should have wooden handles.

K. Do not strike hardened metal or tools with a hard-faced hammer.

L. Avoid mushroomed or battered heads on metal tools by keeping them ground smooth and square.

M. Never carry sharp and pointed tools in your pockets.

N. Do not use worn or broken tools.

(NOTE: Report them to your training sponsor.)

II. Power Tool Safety

A. Be sure all power tools are grounded with three-wire conductor cord.

B. Power tools should be inspected and serviced regularly by qualified maintenance personnel.

C. Read and understand all of the manufacturer's safety recommendations.

D. Be familiar with the operating procedures of the tool being used.

E. Inspect electrical cords to see that they are in good condition.

F. Do not leave electrical cords where they may be run over or damaged.

G. Be sure that all safety guards are in place and in working order.

H. Remove ties, rings, or wristwatch, and roll up long sleeves before using power tools.

I. Be sure that your hands are dry.

J. Make all adjustments and inspections with the power OFF and the electrical cord "Disconnected."

K. Before connecting to a power source, be sure that the switch is in the "Off" position.

L. Wear safety goggles and a dust mask when the work requires it.

M. Be sure that the materials being worked are securely clamped in the machines and will clear all machine parts when moving.

N. Keep your attention focused on the work.

O. A change in sounds during power-tool operation can indicate trouble and should be checked immediately.

P. When work is completed, shut off all power tools.

Q. When work is completed, disconnect the power tool from the power source.

R. After the tool is disconnected, remove blades, bits, or any other cutter from the tool.

S. Store power tools and blades, bits, or other cutters in their proper places.

T. When the power tool will not work properly, remove it from service.

(NOTE: Report it to your training sponsor.)

## ASSIGNMENT SHEET 3--SAFETY

A. Match the statements on the left with the correct word or words in the right hand column. Write the correct words in the spaces.

1. Focus your _____ _____ on the work.
2. Keep tools _____ and clean.
3. All files should have a _____ handle.
4. Do not strike hardened metal or tools _____ _____ _____ _____.
5. Keep tools in their _____ _____.
6. Carry sharp pointed tools with the _____ _____ or _____ down.
7. Keep _____ _____ tools away from the edge of a bench or work area.
8. When using sharp-edged tools _____ away from the body.
9. Keep each tool in its _____.
10. Use the right tool for the _____ job.
11. Learn how to use the tool _____.
12. Avoid mushroomed or battered heads on metal tools by keeping them _____ _____.

a. best condition
b. wooden
c. ground smooth
d. with a hard faced hammer
e. repaired
f. place
g. right
h. full attention
i. cutting edge; point
j. properly
k. cut
l. sharp-edged

B. Select the correct safety rules to follow when using power tools by placing a "✓" in the space provided.

_____ 1. Be sure all power tools are <u>not</u> grounded.

_____ 2. Power tools do not need to be inspected and serviced often.

_____ 3. Read and understand all of the manufacturer's safety recommendations.

_____ 4. Know how to use tools properly.

_____ 5. Inspect electrical cords to see if they are in good condition.

ASSIGNMENT

_____ 6. It is O.K. to wear a tie, rings, and a wristwatch when using power tools.

_____ 7. Be sure that your hands are dry.

_____ 8. Make all adjustments and inspections with the power off and the cable disconnected.

_____ 9. When work is completed, let the power tools keep running.

_____ 10. After a tool is disconnected, remove blades, bits, or any other cutter from the tool.

_____ 11. Leave power tools and blocks, bits, or other cutters outside when you have finished.

_____ 12. When a power tool will not work right, remove it from service.

PLUMBER'S HELPER

INFORMATION SHEET 4--FIRE SAFETY

I. General Rules

A. Practice fire prevention.

B. Find out what material is burning when a fire starts.

C. Report a fire quickly.

D. Know how to use a fire extinguisher.

(WARNING: DO NOT play with firefighting equipment because it may not work when you need it.)

E. Know the types of extinguishers.

(WARNING: Using the wrong type of extinguisher on a fire is dangerous.)

F. Know the location of the fire alarm.

G. Know how to treat burns.

H. Keep a clean shop, with flammables stored properly.

I. Know the correct way to leave a building in case of fire.

(NOTE: If there is not a plan on how to leave the building in case of fire posted by the door, ask your instructor for instructions.)

II. Types of Fires

A. Class A--Ordinary combustibles such as wood, paper, or cloth

B. Class B--Flammable liquids or grease such as gasoline, paints, or oils

C. Class C--Electrical equipment such as motors and switches

III. Types of Extinguishers

A. Foam

1. Used in class A and B fires
2. To use, turn extinguisher upside down
3. Spray so that foam falls on fire

B. Carbon dioxide

1. Used on Class B and C fires
2. To use, squeeze handle
3. Spray near the fire base and move upward

C. Soda acid

1. Used on Class A fires
2. To use, turn extinguisher upside down
3. Spray at the base of the fire

D. Water

1. Use in Class A fires
2. To use, squeeze handle

   (NOTE: A water hose or bucket may also be used.)
3. Spray at the base of the fire

E. Dry chemical

1. Use on Class A, B, and C fires
2. To use, squeeze handle
3. Spray at the base of the fire

IV. Building Evacuation

A. Close all windows and doors as you leave the building.

1. Have someone in your class assigned to this.
2. Move quickly.

B. Make sure all people are out of the building as you leave.

C. Leave the building quickly but in an orderly manner.

(NOTE: Do not run or shove.)

D. Know the best route to take when leaving the building, but also know alternate routes.

E. Move away from the building during a fire.

(NOTE: Explosions often occur during a fire.)

V. Types of burns---------Appearance of skin-------Treatment

A. First degree.....Reddened skin.....Apply cold water

B. Second degree.....Blistered skin.....Apply cold water and sterile gauze

C. Third degree.....Charred or seared skin.....Get immediate medical help

INFORMATION

ASSIGNMENT SHEET 4--FIRE SAFETY

A. Select the correct rules of fire safety. Place a "✓" by the correct rules.

_____ 1. You should practice fire prevention.

_____ 2. You do not need to know what is burning in a fire to put it out.

_____ 3. Always let a fire go out by itself.

_____ 4. Know how to use a fire extinguisher.

_____ 5. When you see a fire, the first thing to do is grab the nearest fire extinguisher.

_____ 6. Know the location of a fire alarm.

_____ 7. Only doctors need to know how to treat burns.

_____ 8. Keep the shop clean and flammables stored.

_____ 9. Know how to leave a building during a fire.

_____ 10. Fire drills are for fun.

B. Circle the answer that best describes the class of fire that is burning.

1. Fire: Flammable liquids, such as gasoline, paint, or oil

   a. Class A  b. Class B  c. Class C

2. Fire: Ordinary combustibles, such as wood, paper, or cloth

   a. Class A  b. Class B  c. Class C

3. Fire: Electrical equipment, such as motors or switches

   a. Class A  b. Class B  c. Class C

C. For each of the five fire extinguishers listed below, tell the class of fire they will put out.

1. Foam  Class _____ or _____

2. Carbon dioxide  Class _____ or _____

3. Gas cartridge  Class _____

4. Water  Class _____

5. Dry chemical  Class _____, _____, or _____



ASSIGNMENT

D. What are the correct procedures for evacuating the building in case of a fire.

1.

2.

3.

4.

5.

E. For each of the burns listed below, describe the appearance of the skin and the type of treatment needed.

| Burn | Appearance of the Skin | Treatment |
|---|---|---|
| a. Third degree | _____ | _____ |
| b. Second degree | _____ | _____ |
| c. First degree | _____ | _____ |

PLUMBER'S HELPER

## INFORMATION SHEET 5--STEEL AND COPPER PIPE AND FITTINGS

I. Terms and Definitions

A. P.S.I.--pounds per square inch

B. I.P.T.--iron pipe thread (American Standard)

C. O.D.--outside diameter

D. I.D.--inside diameter

E. Nominal size--near inside measurement

F. Burr--rough edge on end of pipe

G. Male end--end of pipe or fittings having outside threads

H. Female end--end of pipe or fittings having inside threads

I. Standard--regularly accepted practice

J. Oxidize--combine with oxygen

K. Solder flux--mildly corrosive acid used to clean a surface to be soldered

II. Types of Standard Steel Pipe

A. Galvanized--has a zinc coating, inside and out, to prevent rust

B. Black pipe--uncoated steel pipe

C. Coated pipe--black or galvanized pipe that has been coated for some special purpose

III. Sizes of Standard Steel Pipe

A. Measured by inside diameter (I.D.) and called nominal size

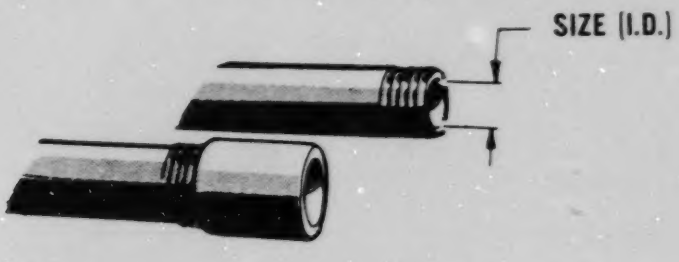
B. Sizes

1. Range from 1/8 inch to 10 inches I.D.

2. Nominal sizes: 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 to 10 inches

C. Manufactured in Various lengths

D. Usually threaded on both ends with a coupling on one end



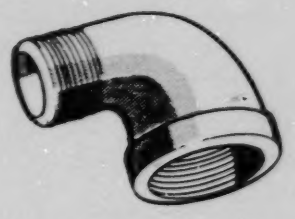

IV. Pipe Fittings and Nipples

A. Fittings

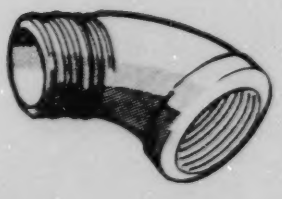
1. 90° elbow (ell)

2. 45° elbow

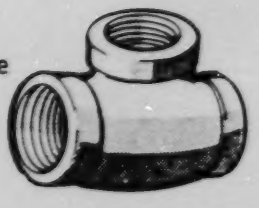
3. 90° street elbow (str ell)

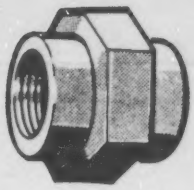


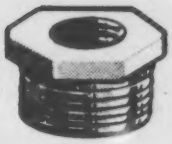
4. 45° street elbow

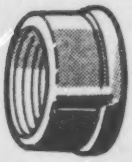


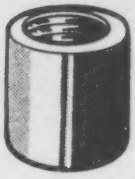
5. Tee

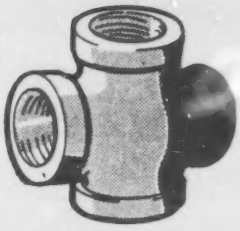


6. Union 

7. Bushing 

8. Cap 

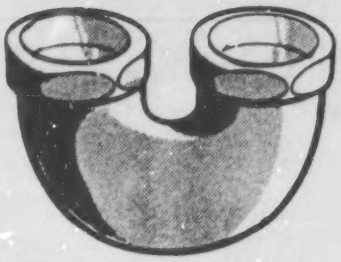
9. Coupling 

10. Cross 

11. Plug

12. Reducer

13. Return bend

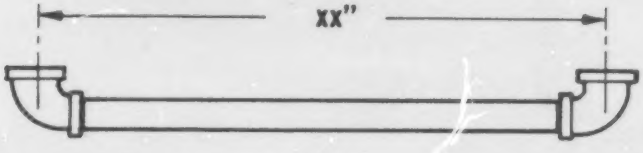


B. Steel nipples--length up to 12 inches

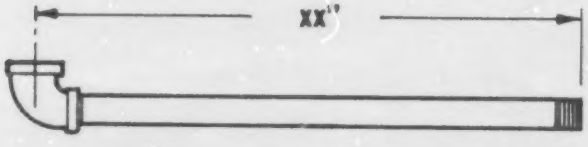
V. Pipe Measurement and Fitting Allowance

A. Three methods of measurement

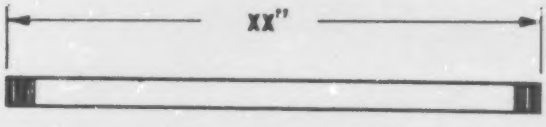
1. Center-to-center




2. End-to-center




3. End-to-end




B. Fitting Allowance

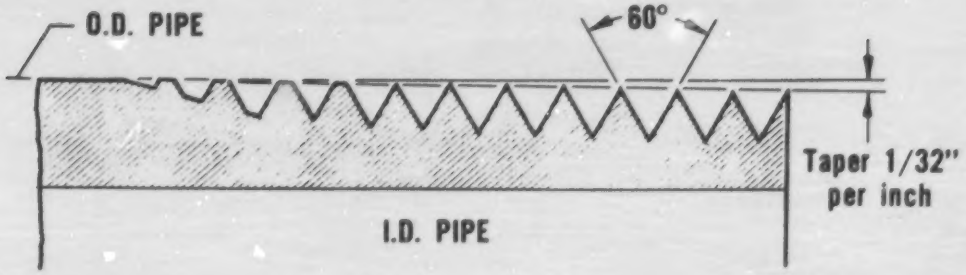
VI. Threads and Threading

A. Provide water-tight seal at all connections

B. Provide strong holding connection

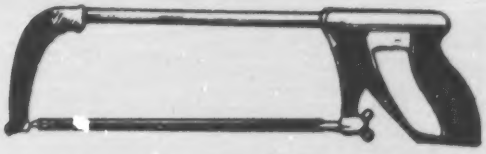
C. American Standard Thread is water-tight hold

D. Tapered to assure strong water-tight hold

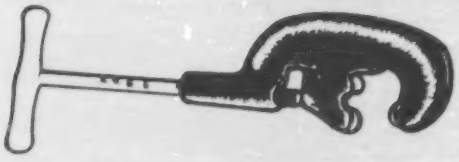



VII. Tools and Material Used on Steel Pipe

A. Hacksaw

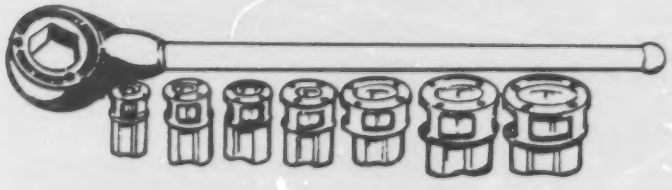


B. Pipe cutter

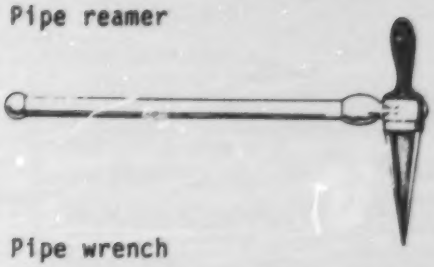


C. Pipe vise

D. Ratchet threader



E. Pipe reamer



F. Pipe wrench

G. Thread cutting oil

H. Thread sealing compound

VIII. Types of Copper Tubing

A. Type K

1. Can be hard or soft tempered

(NOTE: Tempering is a process which changes the hardness of metal.)

2. Hard temper used with solder joints for new plumbing

3. Soft temper bends easily and is used with flare fittings for:

a. Repairs

b. Underground lines

c. Gas service lines

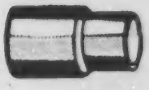
B. Type L

1. Tubing wall thinner than Type K

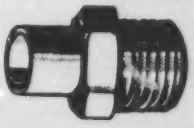
2. Can be hard or soft tempered

4. Coupling

5. Coupling reducer

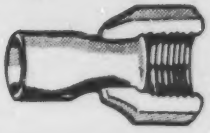


6. Sweat to pipe



7. Sweat to flare

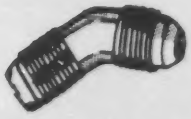
8. Sweat to swivel



B. Flare fittings--used for soft temper tubing

1. Male elbow 90°

2. Male elbow 45°



3. Soft tempered used with flare fitting for repairs

4. Hard temper used with solder joints for new plumbing

C. Type M

1. Tubing wall thinner than Type L

2. Can be hard or soft tempered

3. Used for low pressure lines such as:

a. Water supply to evaporative coolers

b. Fixture supplies

c. Small drains

d. Low pressure gas supply to stoves and furnaces (soft tempered only)

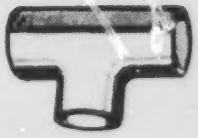
IX. Types of Fittings for Copper Tubing

A. Sweat solder fittings--used for hard temper tubing

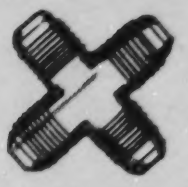
1. Elbow

2. Cap

3. Tee



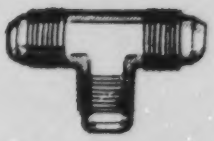
3. Cross



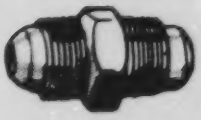
4. Long nut

5. Cap nut

6. Tee



7. Union



8. Female adapter (flare x N.P.T.)

9. Male adapter (flare x N.P.T)

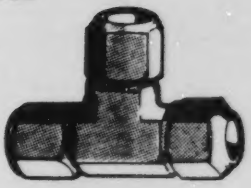
C. Compression fittings--used for soft temper and refrigeration tubing

1. Compression sleeve

2. Nut

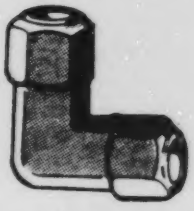
3. Union

4. Tee

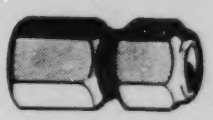


5. Compression to pipe union

6. 90° Elbow



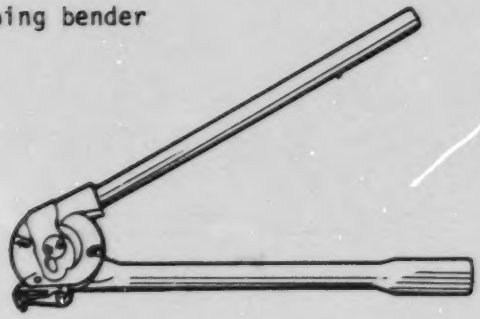
7. Female adapter



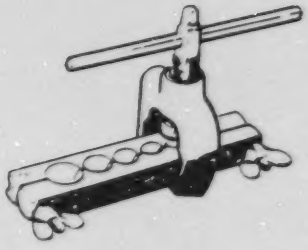
X. Tools Used on Copper Tubing

A. Tubing cutter

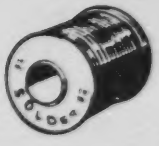
B. Tubing bender



C. Flaring tool



D. Propane torch and solder



XI. General Plumbing Tools

A. Handsaw

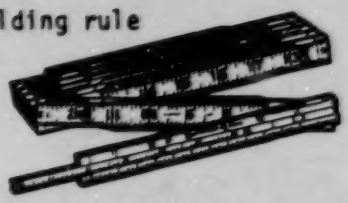
B. Keyhole saw

C. Circular saw

D. Cold chisel

E. Wood chisel

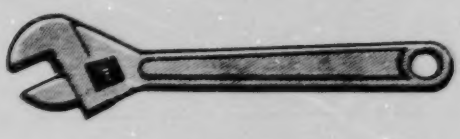
F. Folding rule



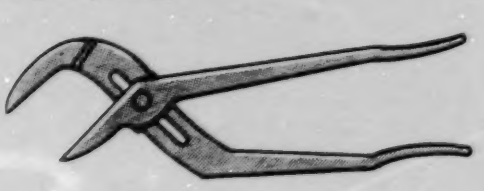
G. Claw hammer

H. Drain spade

I. Adjustable wrench



J. Pipe jaw pliers



PLUMBER'S HELPER

ASSIGNMENT SHEET 5--STEEL AND COPPER PIPE AND FITTINGS

A. Match the plumbing definition in the right column to the correct term in the left column by placing the correct letter in the blank.

| | | |
|---|---|---|
| _____ 1. | I.D. | a. outside diameter |
| _____ 2. | O.D. | b. pounds per square inch |
| _____ 3. | I.P.T. | c. iron pipe thread |
| _____ 4. | P.S.I. | d. inside diameter |
| _____ 5. | Burr | e. rough edge on end of pipe |
| _____ 6. | Male end | f. combine with oxygen |
| _____ 7. | Female end | g. mildly corrosive acid used to clean surface to be soldered |
| _____ 8. | Oxidize | h. end of pipe having outside threads |
| _____ 9. | Solder flux | i. end of pipe having inside threads |

B. Identify the types of standard steel pipe below. Place a " ✓" in the blank beside each of the correct types.

_____ 1. Galvanized

_____ 2. Brown

_____ 3. Black

_____ 4. Coated

C. Select the true statements about sizes of standard steel pipe. Place a "✓" in the blank.

_____ a. Measured by inside diameter

_____ b. Measured by outside diameter

_____ c. Sizes range from 1/8 inch to 10 inches I.D.

_____ d. Steel pipe is manufactured in only one length

_____ e. Lengths are usually threaded on both ends



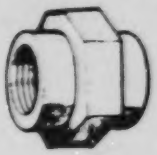
ASSIGNMENT

D. Identify the pipe fittings. Write the name of each in the blank. Select your answer from the list below.

| | |
|---|---|
| 90° elbow | Cross |
| Tee | Coupling |
| Union | Reducer |
| Plug | Cap |

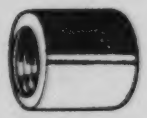
1. _____

2. _____

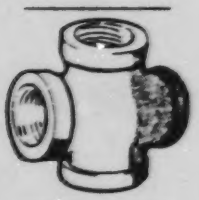


3. _____

4. _____

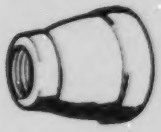


5. _____



6. _____

7. _____



8. _____

E. List three methods of pipe measurement.

1. _____

2. _____

3. _____

F. Determine which of the statements are true about threads and threading. Place a T in the blank for True and an F in the blank for False.

_____ 1. Threads provide a water tight seal at connections.

_____ 2. Threads provide a strong holding connection.

_____ 3. Pipe threads are straight.

_____ 4. American Standard Thread is the standard pipe thread.

G. List three tools and other materials used when working with steel pipe.

| Tools | Materials |
|---|---|
| 1. _____ | 1. _____ |
| 2. _____ | 2. _____ |
| 3. _____ | 3. _____ |

H. Identify the types of copper tubing. Place a " ✓" in the blank beside the correct types.

_____ 1. Type M

_____ 2. Type K

_____ 3. Type L

_____ 4. Type A

_____ 5. Type C

I. Select the types of fittings used on copper tubing. Place a T in the blank for True and an F in the blank for False.

_____ 1. Sweat solder joint

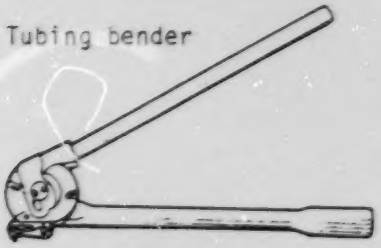
_____ 2. Flare

_____ 3. Retention

_____ 4. Compression

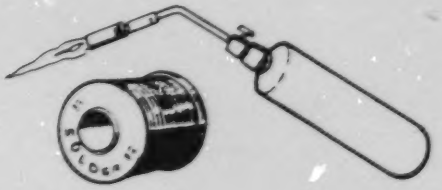
J. Identify the tools used on copper tubing. Write your answer in the blank.

Tubing cutter

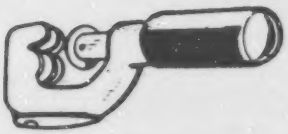


Flaring tool

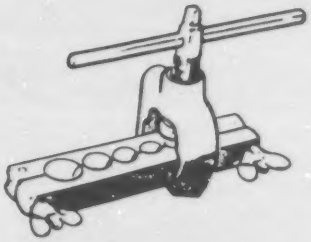
Tubing bender



1. _____ 2. _____



3. _____



4. _____

K. List six tools used in plumbing.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

PLUMBER'S HELPER

INFORMATION SHEET 6--PLASTIC PIPE AND FITTINGS

I. Terms and Definitions

A. PVC--plastic pipe (Polyethylene Vinyl Chloride)

B. CPVC--plastic pipe suitable for hot or cold liquids but used mainly for hot liquids

C. HWP--hot water pipe

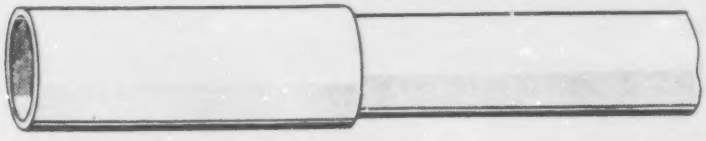
D. Rigid--not to be bent more than 15 or 20 degrees

E. Flexible--easy to bend (long sweeping bend)

F. Belled end--end has been enlarged to serve as a coupling

G. Plain end--a straight end with no bell or coupling

H. Coupled end--end of pipe has a coupling attached



I. Universal--has more than one use

J. Brittle--easily cracked or broken

K. Insert--place inside

II. Types of Plastic Pipe and Fittings

A. PVC 160 and PVC 200 rigid plastic pipe (PVC 160)

1. Sizes 1/2-inch through 2-inch inside diameter (I.D.)

(NOTE: I.D. sizes are 1/2, 3/4, 1, 1 1/4, 1 1/2 and 2 inches.)

2. Lengths are 20 feet with belled or coupled ends

3. Used for working pressure of 160 to 200 pounds per square inch (P.S.I.) at 73° F

4. Used for cool liquids

   a. water

   b. petroleum products

   c. natural gas

5. Joints are glued

B. PVC schedule 40 rigid plastic pipe (SCH40)

1. Sizes 1/2-inch through 2 inches I.D.

2. Lengths are 20 feet with coupled ends

3. Pipe wall is thicker than PVC 160 or PVC 200

4. Used for working pressures up to 280 P.S.I. in 2-inch diameter and up to 600 P.S.I. in 1/2-inch diameter

5. Used for cool liquids

   a. water

   b. petroleum products

6. Joints are glued (cemented)

C. CPVC hot or cold rigid plastic pipe

1. Sizes 1/2 and 3/4 inch diameter

2. Lengths are 10 and 20 feet with plain ends

3. Used for working pressures of 100 P.S.I. at 180°

4. Used for hot or cold liquids

   a. water

   b. petroleum products

   c. others

5. Joints are glued (cemented)

D. Polyethylene flexible plastic pipe

1. Sizes 1/2 inch through 2 inch I.D.

2. Lengths are 100 to 300 feet rolls with plain ends

3. Used for working pressures up to 100 P.S.I.

4. Used for cool liquids

   a. water

   b. petroleum products

   c. natural gas

5. Joints are made with inserts and clamps

III. Joining Plastic Pipe and Fittings (See IS-1)

A. The letter "C" means the PVC fitting joint is to be glued (cemented)

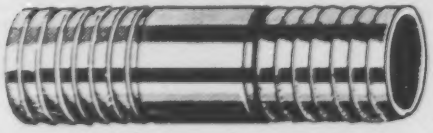
B. The letter "T" means the PVC fitting joint is threaded

C. The letters "C x T" means the PVC fitting is glued (cemented) on one end and threaded on the other

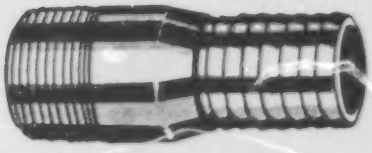
D. Insert fittings and clamps

1. Inserts can be metal or plastic.

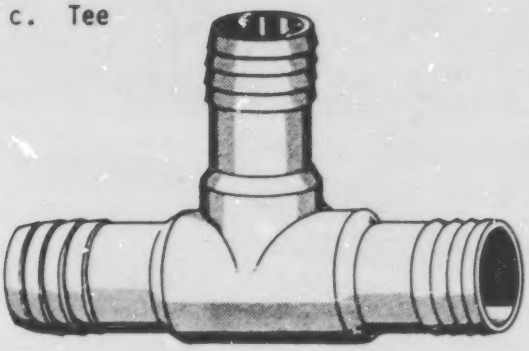
   a. Insert coupling



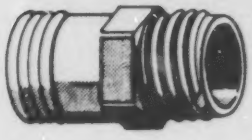
   b. Insert adapter



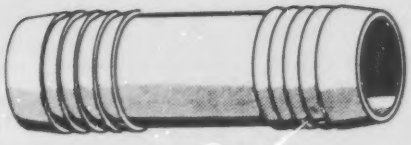
c. Tee



d. Male adapter



e. Coupling



f. Large clamp

g. Small clamp

2. Inserts and clamps are used when the joint is not glued or threaded.

E. Straps

1. Used to support PVC pipe

2. Should be placed at least every 48 inches

3. Used to prevent PVC pipe from sagging

IV. Cements and Cleaners

A. Clear fast set PVC cement

1. Used for most PVC installation

2. Used only on pipes carrying cool liquid

B. CPVC hot line cement (HWP)

1. Used for CPVC pipe

2. Used on hot water pipe

C. Universal cement can be used for all plastic pipe.

D. Universal cleaner can be used for all plastic pipe.

V. Precautions of Plastic Pipe

A. Do not use plastic pipe to carry explosive gas or liquid under concrete slabs.

B. Plastic pipe becomes brittle if exposed to extreme cold (below 32°F) and should be insulated.

C. Always use the type of cement and cleaner recommended by the manufacturer.

D. PVC cement and cleaner should be used in a well vented area since it is toxic and highly explosive.

E. Always follow directions on the can when using PVC cement and cleaner.

PLUMBER'S HELPER

ASSIGNMENT SHEET 6--PLASTIC PIPE AND FITTINGS

A. Match the definitions in the right hand column to the term in the left column. Place the correct number in the space provided.

| | |
|---|---|
| _____ a. PVC | 1. end of pipe has a coupling attached |
| _____ b. CPVC | 2. easy to bend |
| _____ c. HWP | 3. not to be bent |
| _____ d. Insert | 4. a straight end with no bell or coupling |
| _____ e. Rigid | 5. plastic pipe suitable for hot or cold liquids |
| _____ f. Brittle | 6. hot water pipe |
| _____ g. Flexible | 7. plastic pipe |
| _____ h. Plain end | 8. end has been enlarged to serve as a coupling |
| _____ i. Belled end | 9. place inside |
| _____ j. Coupled end | 10. easily cracked or broken |

B. List four types of plastic pipe and fitting.

1.

2.

3.

4.

C. Select the correct statements about joining plastic pipe. Place a T for True and an F for False in the blanks.

_____ a. The letter "C" means the joint is to be glued.

_____ b. The letter "T" means the joint is to be cemented.

_____ c. The letters "CXT" mean the PVC fitting is glued on one end and threaded on the other.

_____ d. Insert fittings are made of metal only.

_____ e. Straps should be used to support PVC pipe every 48 inches.



ASSIGNMENT

D. Identify the correct types of PVC cements and cleaners. Place a "✓" in the blank.

_____ 1. Clear fast set PVC cement

_____ 2. CPVC cement

_____ 3. HVPC cement

_____ 4. Universal cleaner

_____ 5. ABC cleaner

_____ 6. Combination cleaner and cement

E. Select the correct statements about precautions of plastic pipe. Place a "✓" in the blank.

_____ a. Plastic pipe may be used to carry explosive gases or liquids under a concrete slab.

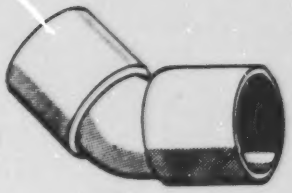
_____ b. Plastic pipe should be insulated if it is exposed to extreme cold.

_____ c. All PVC cements and cleaners are used in the same manner.

_____ d. Use the type of cement and cleaner recommended by the manufacturer.

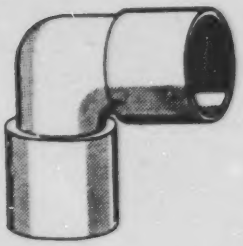
# PLASTIC FITTINGS
# PVC and CPVC

**45° ELL**



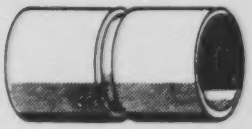
C×C

**90° ELL**



C×C

**COUPLING**

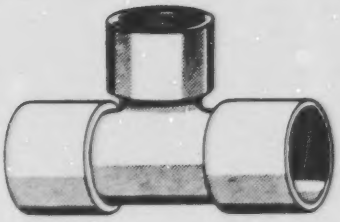


C×C

**CAP**

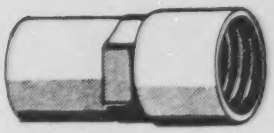
C

**TEE**



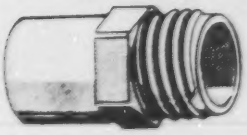
C×C×C

**FEMALE ADAPTER**



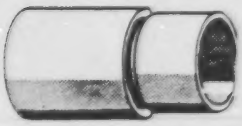
C×T
(PVC only)

**MALE ADAPTER**



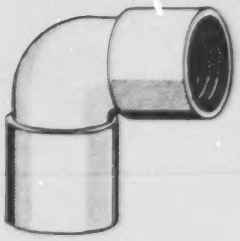
C×T

**REDUCER**



C×C

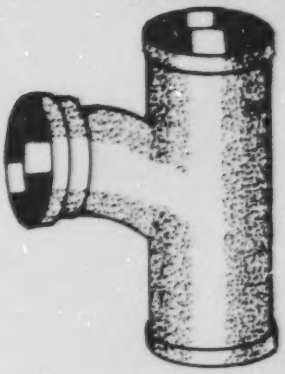
**90° ELL**



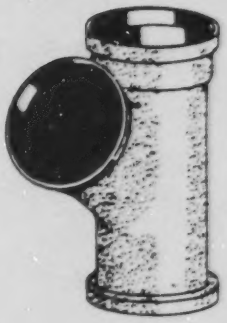
C×T
(PVC only)

# CAST IRON PIPE FITTINGS

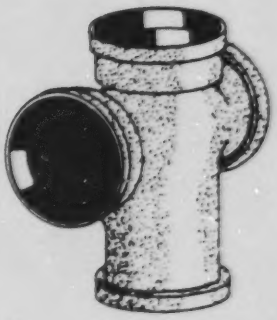
SANITARY T



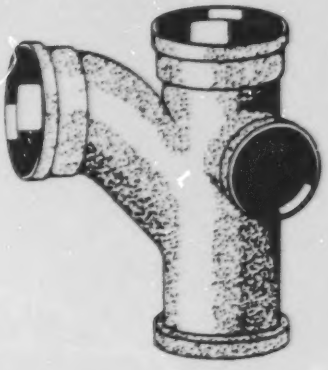
SANITARY Y



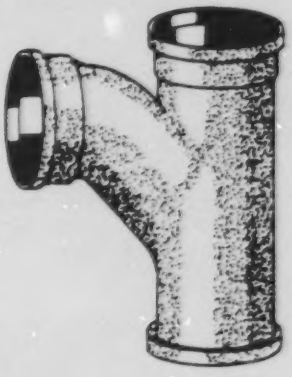
SANITARY CROSS



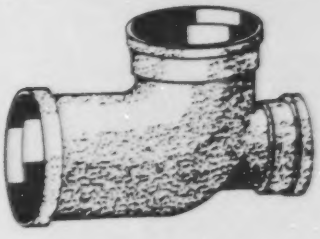
TEE WITH 90° INLET



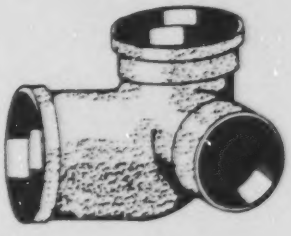
COMBINATION Y AND 1/8 BEND



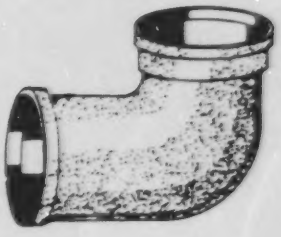
¼ BEND WITH HEEL INLET



¼ BEND WITH SIDE INLET



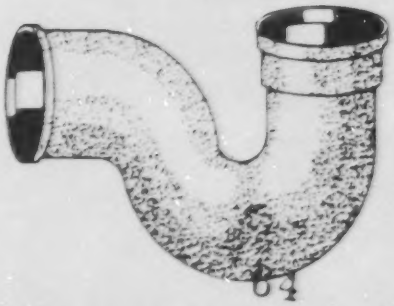
90° ¼ BEND



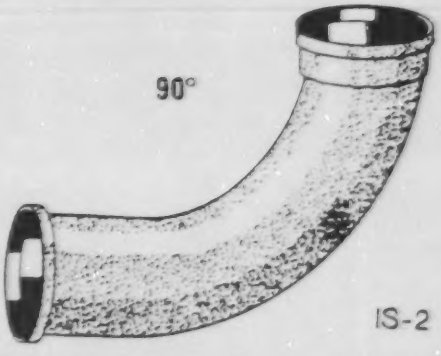
LONG SWEEP ¼ BEND

45° 1/8 BEND

P-TRAP



90°



PLUMBER'S HELPER

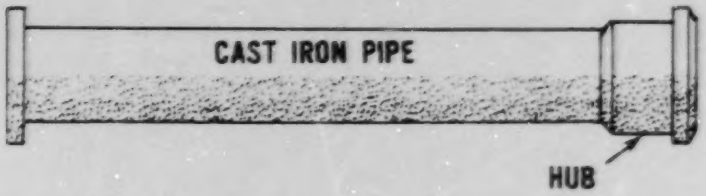
INFORMATION SHEET 7--DRAIN, WASTE AND VENT LINES

I. Terms and Definitions

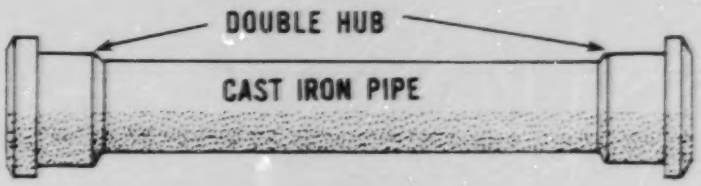
A. Lead--a metal melted to make a water-tight seal in cast iron pipe

B. Hub--bell-shaped joint on end of cast iron pipe

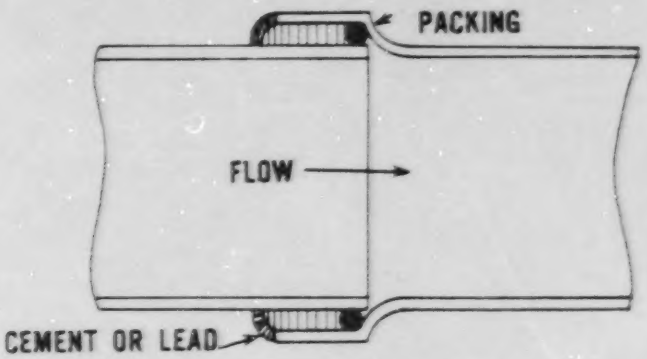
C. Single hub--hub on one end of cast iron pipe




D. Double hub--hub on both ends of cast iron pipe




E. Packing--a seal made at the joint of cast iron or clay pipe

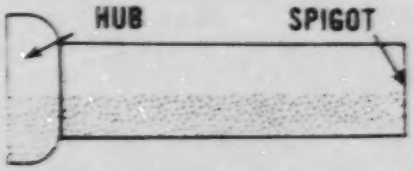



F. Jute--a fiber used to make a packing

(NOTE: The same fiber used to make hemp rope)

G. Oakum--jute that has been treated in tar and used for packing

H. Spigot--the plain end of a length of pipe usually not threaded




I. Main--a large sewer, water, or gas pipe that serves many houses

J. DWV--drain-waste-vent

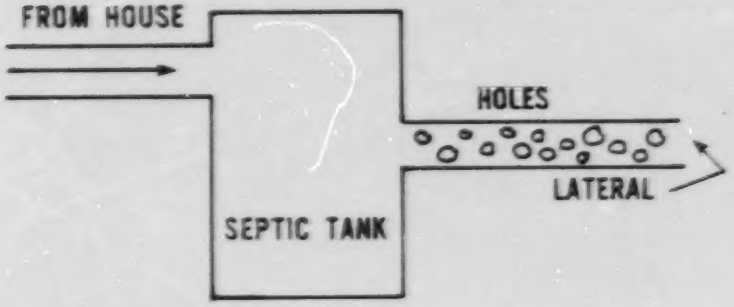
K. Perforated--has holes punched in a regular pattern

L. Adaptor--a fitting used to join two pipes of different diameters

M. Soil pipe--large pipes used to carry sewage

N. Durability--long-lasting

O. Laterals--pipe or lines that drain septic tanks




II. Types of DWV Pipe

A. Cast iron

B. Clay

C. Plastic

D. Galvanized steel

E. Copper

III. Cast Iron Pipe and Fittings (See IS-2)

A. Sizes

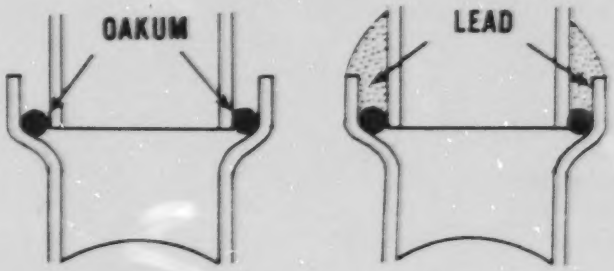
1. Two-, three-, and four-inch I.D.

2. Five- and ten-foot lengths

B. Single hub or double hub

C. Used for drains in bathrooms, kitchens, laundries, and fixtures where quality is important

D. Joined by tamping oakum into the joint and pouring in melted lead




E. Used for high quality and durability

F. Used under buildings, slabs, and as drain lines to mains

G. Fittings

IV. Clay Soil Pipe

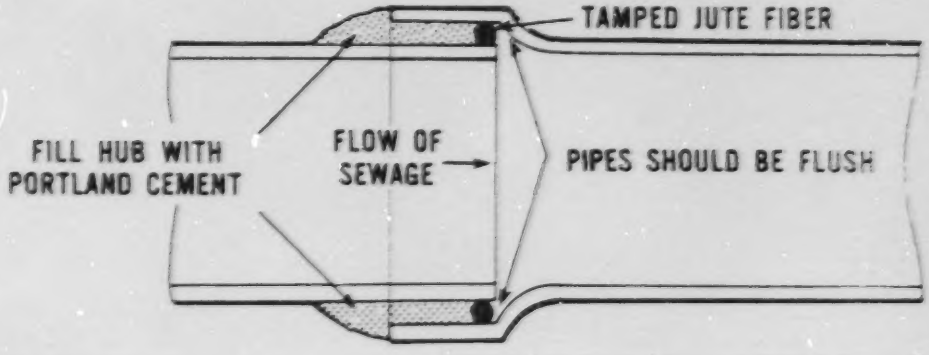
A. Sizes

1. Two-and six-inch I.D.

2. Two- and four-foot lengths

B. Used for drain lines from house to sewer main

C. Joined by tamping oakum into the joint and filling with portland cement




V. Plastic DWV Pipe

A. Sizes

1. 1 1/2 to 4 inches I.D.

2. Lengths up to 20 feet

B. Used for drain lines from house to main

C. Perforated plastic DWV used for lateral lines on septic tanks

D. Joined by using PVC glue

E. Easy to install, economical, and long lasting

VI. Galvanized Steel Pipe

A. Same as galvanized water pipe

B. Sizes are various lengths and diameters

C. Joined with threaded, black, or galvanized cast fittings

D. Used for durability

VII. Copper DWV Pipe

A. Sizes

1. 1 1/2 to 4 inches I.D.

2. Twenty-foot lengths

B. Used in residential and commercial drainage plumbing

C. Joined by sweat solder joints

D. High quality and easy installation

VIII. Tools Used to Join Cast Iron Pipe

A. Melting pot and ladle

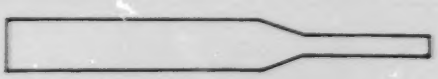
B. Burner for melting pot

C. Hacksaw

D. Cold chisel

E. Hammer

F. Yarning iron



G. Offset caulking iron

PLUMBER'S HELPER

ASSIGNMENT SHEET 7--DRAIN, WASTE, AND VENT LINE

A. Match the definitions on the right with the terms on the left. Place the correct number in the space provided.

| | | |
|---|---|---|
| _____ a. Packing | | 1. bell-shaped joint on end of cast iron pipe |
| _____ b. Main | | 2. metal used to make a seal on cast iron joint |
| _____ c. Lead | | 3. a seal made at the joint of cast iron or clay pipe |
| _____ d. Oakum | | 4. jute treated in tar and used for packing |
| _____ e. Hub | | 5. drain, waste, vent |
| _____ f. DWV | | 6. large sewer, water or gas pipe serving many houses |
| _____ g. Spigot | | 7. plain end of pipe usually not threaded |
| _____ h. Perforated | | 8. holes punched in a regular pattern |

B. Identify the correct characteristics of DWV pipe by placing a "✓" in the blank.

_____ 1. Cast iron

_____ 2. Used for water lines

_____ 3. Glass marble

_____ 4. Plastic

_____ 5. Copper

C. Identify the following about cast iron pipe by placing a T for True or an F for False in the space provided.

_____ 1. Single hub or double hub

_____ 2. Joined with cement

_____ 3. Used for high pressure lines

_____ 4. Can be cut with a knife

_____ 5. Joined with oakum and lead



ASSIGNMENT

_____ 6. Cast iron and clay pipe are joined in the same way

_____ 7. Galvanized pipe and cast iron are made of the same material

_____ 8. Cast iron pipe is threaded on each end

D. Place a "✓" by the tools used in joining cast iron.

_____ 1. Melting pot and ladel

_____ 2. Rubber hammer

_____ 3. Hacksaw

_____ 4. Yarning iron

_____ 5. Tire tool

_____ 6. String line

PLUMBER'S HELPER

INFORMATION SHEET 8--FIXTURES AND VALVES

I. Terms and Definitions

A. Fixture--something built into place for a specific use

EXAMPLES: sink, bathtub, or lavatory

B. Valve--a device used to control the flow of gas or liquid

C. Faucet--a type of valve

D. Enamel--baked-on finish that gives a glossy appearance

E. P.O. Plug--patent overflow plug

F. Diverter--a device that switches the direction of flow

G. Water Closet--bathroom commode

H. Elongated--the length of an object is greater than the width

I. Vitreous--glossy, slick surface

J. Bibb--a faucet with a bent-over spout

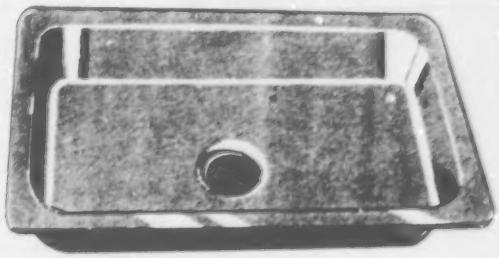
II. Kitchen Sinks

A. Types

1. Single compartment

a. Flat rim

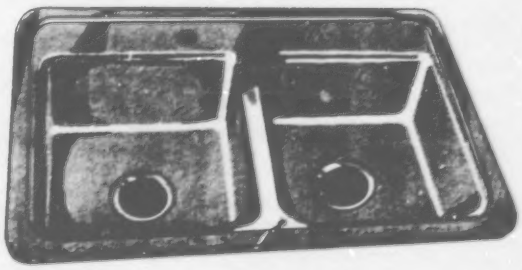
b. Ledge rim



2. Double compartment

a. Flat rim

b. Ledge rim



B. Materials

1. Vitreous china--made of very fine clay and finished with a glassy, slick surface

2. Pressed steel--sheet steel that is pressed to shape

3. Cast iron

C. Finishes--the material of which the surface is made

1. Stainless steel

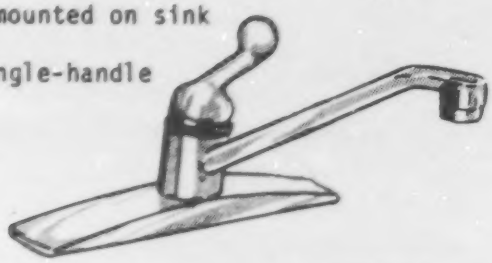
2. White enamel

3. Colored enamel

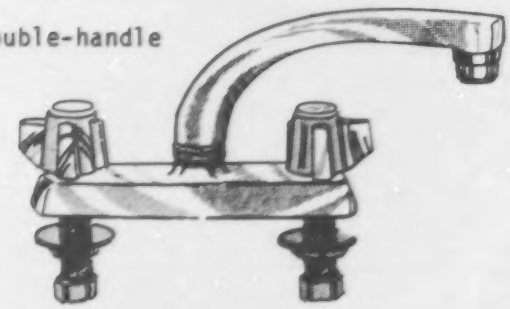
D. Types of faucets

1. Deck--mounted on sink

a. Single-handle



b. Double-handle

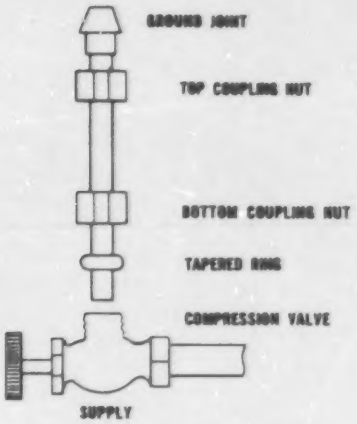


2. Wall-mounted--Double-handle

3. Spray

E. Drains and fittings

1. Supplies--cold and hot water lines

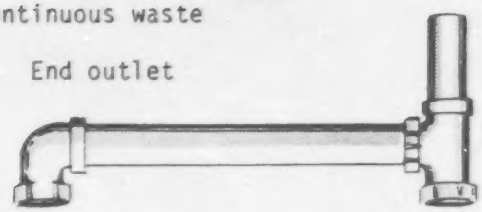


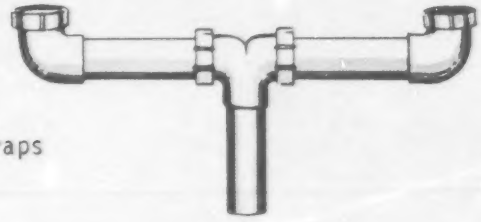

2. Strainers

a. Flat top

b. Basket

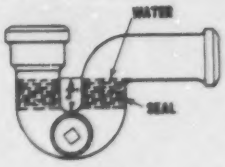
3. Continuous waste

a. End outlet 

b. Center outlet 

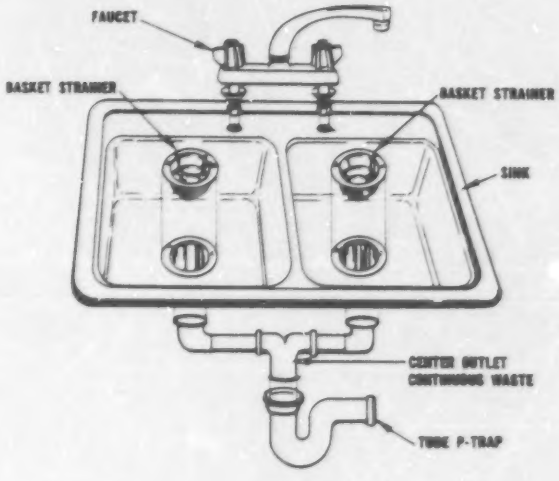
4. Traps

a. P-trap




b. S-trap

F. Assembly of kitchen sink

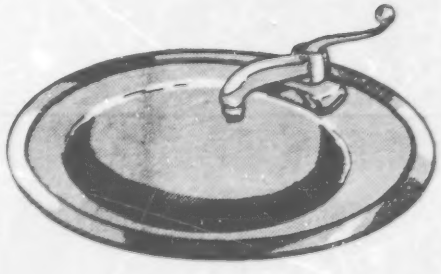



III. Bathroom Lavatories

A. Types

1. Countertop

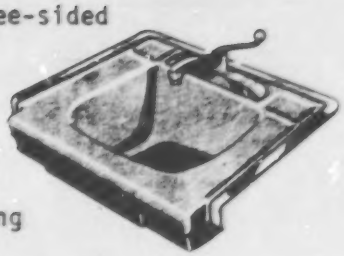
a. Round



b. Rectangular

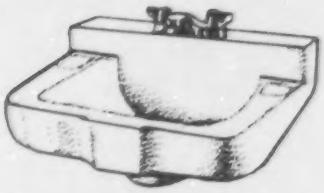
c. Oval

d. Three-sided

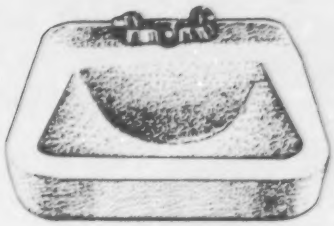


2. Wall-hung

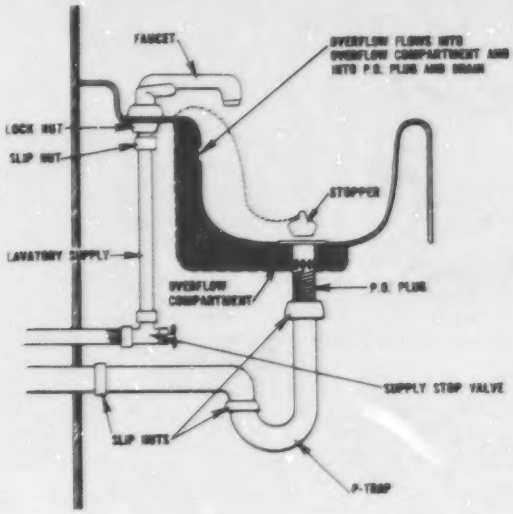
a. Ledge back



b. Flat back



B. Assembly of bathroom lavatory




C. Materials

1. Vitreous china
2. Pressed steel
3. Cast iron

D. Finishes

1. Stainless steel
2. White enamel
3. Colored enamel

E. Types of faucets

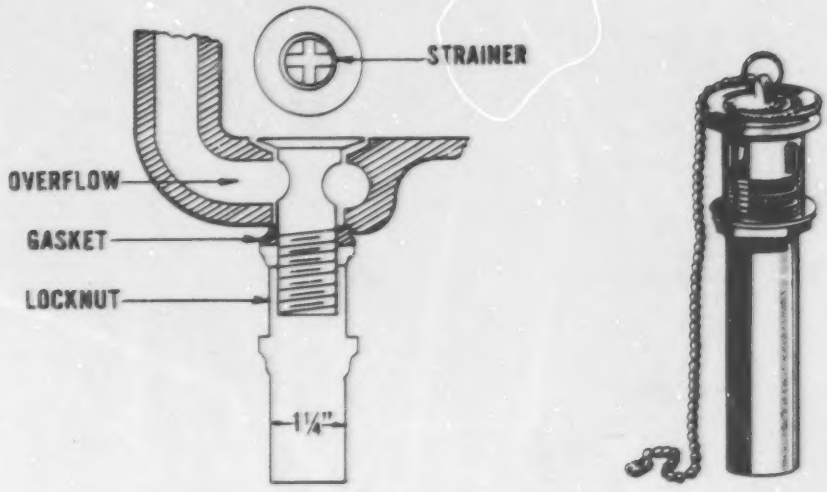
1. Single handle

2. Double-handle

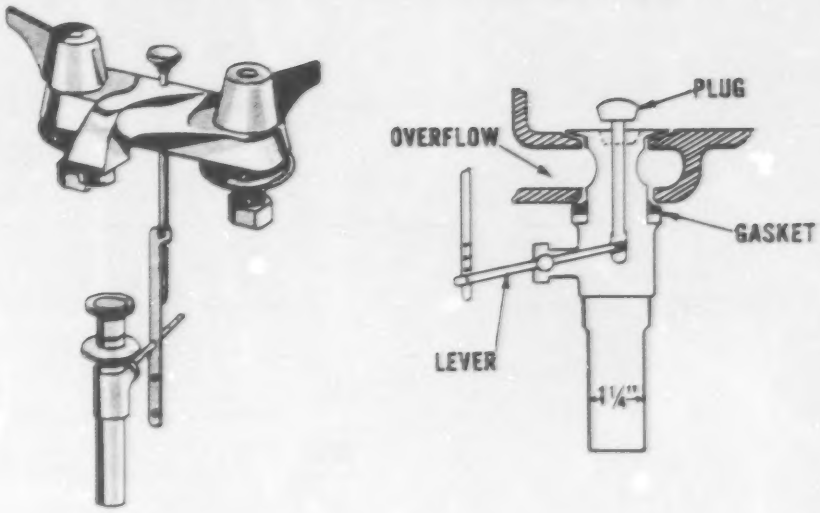
E. Drains and fittings

1. Types of drains

a. Chain stopper and P.O. plug




b. Pop-up




2. Traps--(Use the same as for kitchen sinks)

a. P-trap

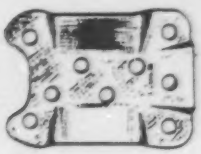
b. S-trap

3. Supplies--cold and hot water lines

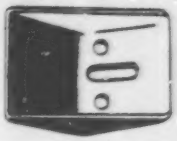
IV. Sink and lavatory fasteners

A. Types of hangers--used to support the sink or lavatory

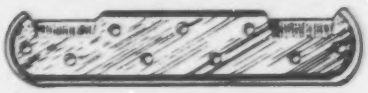
1. Universal--fits most fixtures



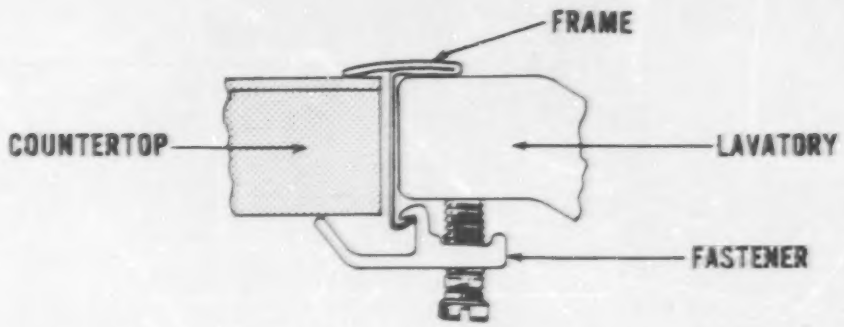
2. China fixtures



3. Steel and cast iron



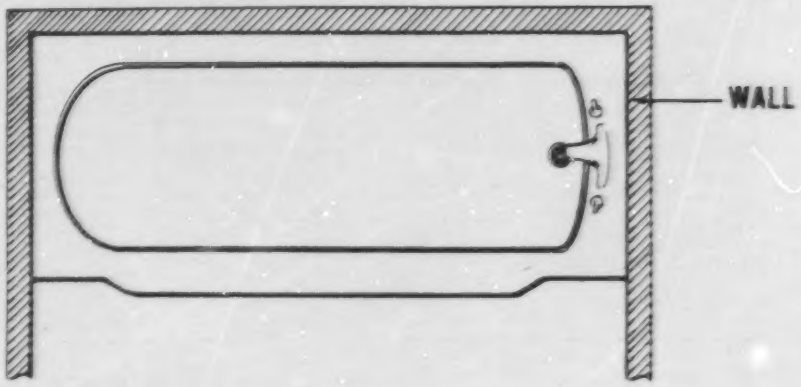
B. Fastener frame--used to clamp the fixture to the countertop



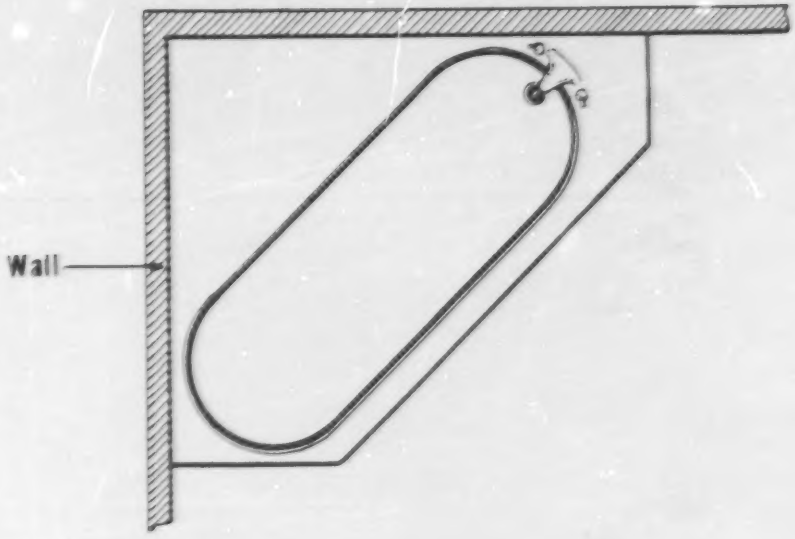

V. Bathtubs and Showers

A. Types

1. Recess--enclosed by walls at both ends and back




2. Corner--enclosed by wall at one end and back



3. Freestanding--away from the walls

B. Materials

1. Steel

2. Cast-iron

C. Finishes

1. White enamel

2. Colored enamel

D. Faucets

1. Single-handle

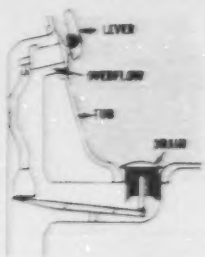
2. Single-handle with shower

3. Double-handle

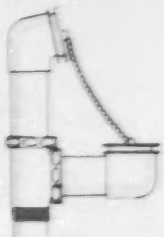
4. Double-handle with shower

E. Bathtub drains and fittings

1. Waste and overflow with trip lever

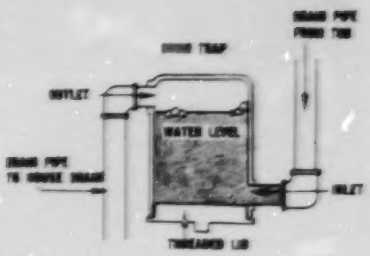



2. Waste and overflow with chain stopper

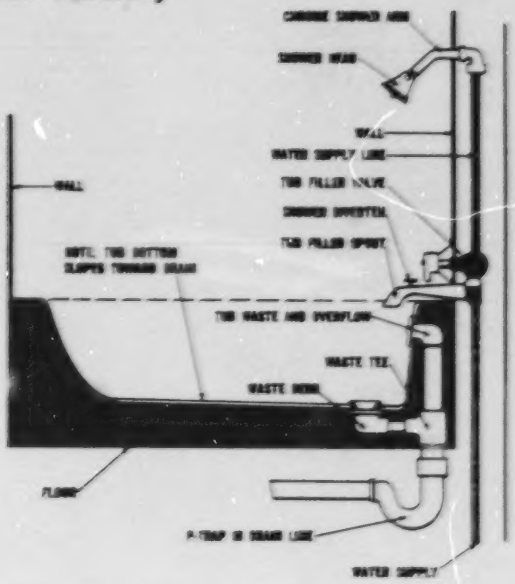


3. Rough brass P-trap

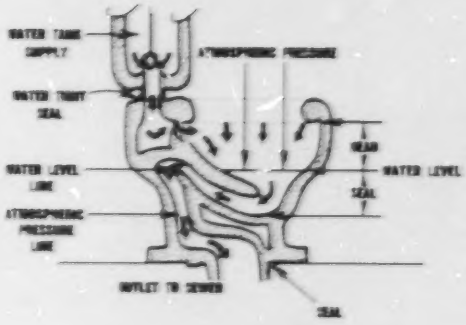
4. Drum trap with bottom cleanout

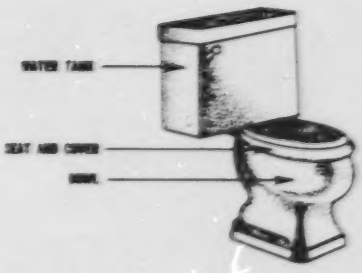



F. Bathtub and shower assembly



VI. Water Closet






A. Types

1. Washdown--water enters bowl from around the rim

2. Syphon jet--Water enters bowl from around the rim and below water level line

(NOTE: Both types come in round bowl, shallow bowl, and elongated bowl.)

B. Materials--made of vitreous china

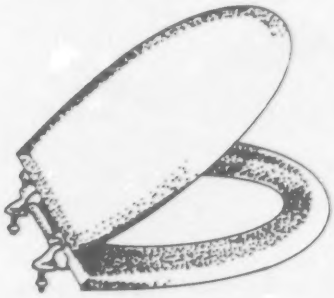
C. Finishes

1. White enamel

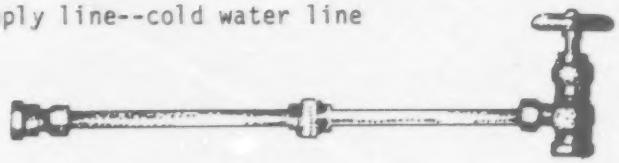
2. Colored enamel

D. Trim and connections

1. Seat and cover



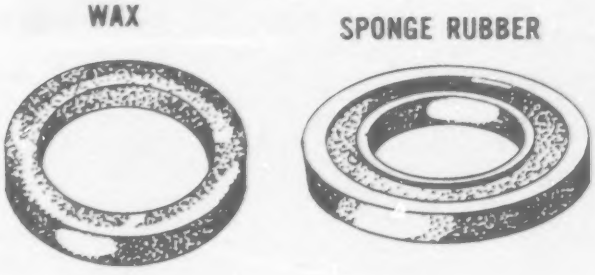
2. Supply line--cold water line



3. Types of floor seals

a. Wax

b. Sponge rubber






INFORMATION

c. Plastic

E. Styles

1. Wall-hung--tank hung on wall
2. Closed-coupled--tank mounted on bowl
3. One-piece--tank and bowl are molded as one piece
4. Vacuum flush
   a. Has no tank
   b. Water enters bowl through a vacuum flush valve
   c. Used in public buildings

VII. Types of Valves

A. Gate

(NOTE: Gate valves are also called stop valves.)

GATE

1. Should be used only in the "open" or "closed" position
2. Will chatter and vibrate if only partially closed
3. Made with both rising and nonrising stems
4. Used for water, gas, steam or oil

B. Globe

1. May be used in open, closed, or partially closed position

2. May be repacked at the stem
3. Used to regulate flow
4. Four types:
   a. Conventional disc
   b. Composition disc
   c. Needle-valve type
   d. Plug-valve type

GLOBE

C. Compression
   1. Similar to a globe valve but used for lighter duty
   2. Used in most residential buildings
   3. Made in sizes 3/8, 1/2, and 3/4 inch diameter inlets
   4. Can be made for threaded or sweat solder joints

COMPRESSION

D. Ball--used as a stop valve

BALL

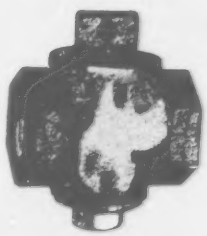
E. Swing-check
   1. Prevent flow of gas or fluids in the wrong direction
   2. Two basic types
      a. Swing check
      b. Lift check
   3. Sizes 1/8-inch to 2-inches made of brass
   4. Sizes 3 inch to 6 inch made of cast iron

STOP & WASTE

F. Stop and waste--used on water lines

TUBE CONNECTOR

G. Tube connector--used with copper tubing



GAS STOP

H. Gas stop--used on gas service line

VIII. Types of Bibbs and Cocks

A. Hose bibb--has threaded spout for hose connection

HOSE BIBB

B. Plain bibb--used to supply water to lavatories

PLAIN BIBB

C. Sill cock--used for water supply on outside walls

SILL COCK

D. Boiler cock--used on water heaters

BOILER COCK

E. Special sill cock--has threaded outlet for evaporative cooler line

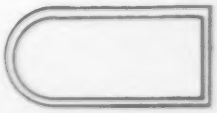
SPECIAL SILL COCK

IX. Architectural Plumbing Symbols

A. Used to locate fixtures and appliances on blueprint

B. Can be done free style or use template

Kitchen sink

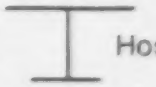


Roll rim tub

Meter

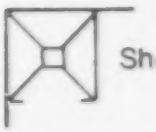
Water closet

Angle tub



Hose bibb or faucet

Lavatory



Shower stall

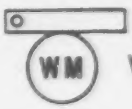
Gas range

Water heater

Drain

D

Dryer




Washing machine

PLUMBER'S HELPER

ASSIGNMENT SHEET 8--FIXTURES AND VALVES

A. Match the terms in the right hand column to the correct definitions on the left. Place the number in the blank.

| | | |
|---|---|---|
| _____ a. | Patent overflow plug | 1. Valve |
| _____ b. | A device used to control the flow of gas or liquid | 2. Fixture |
| _____ c. | A type of valve | 3. P.O. plug |
| _____ d. | Something built into place for a specific use | 4. Diverter |
| _____ e. | A faucet with a bent-over spout | 5. Water closet |
| _____ f. | Glassy, slick surface | 6. Vitreous |
| _____ g. | Bathroom commode | 7. Bibb |
| _____ h. | The length is greater than the width | 8. Faucet |
| _____ i. | A device that switches the direction of flow | 9. Enamel |
| _____ j. | Baked on finish that gives a glossy appearance | 10. Elongated |

B. Select the true statements about kitchen sinks. Place a "✓" in the blank.

_____ 1. The two types of kitchen sinks are the single and double compartment.

_____ 2. The three most common materials used to make sinks are vitreous china, cast iron, and lead.

_____ 3. Three kinds of finishes on sinks are stainless steel, white enamel, and colored enamel.

_____ 4. Deck, wall, and dish spray are three types of faucets.

_____ 5. A sanitary tee is used to connect the sink water supply.

C. Select the true statements about bathroom lavatories by placing a "✓" in the blank.

_____ 1. There are only round and rectangular shaped lavatories.

_____ 2. The two types of lavatories are countertop and wall-hung.

_____ 3. The two types of wall-hung lavatories are ledge back and flat back.

_____ 4. The materials lavatories are made of are vitreous china, pressed steel, and lead.

_____ 5. The two types of faucets used on lavatories are single-handle and double-handle.

D. List three types of hangers used to support sinks and lavatories.

1. _____

2. _____

3. _____

E. Select the true statements about bathtubs. Place a "✓" in the blank.

_____ 1. The three types of tubs are recess, corner, and freestanding.

_____ 2. The two types of materials used to make tubs are cast iron and steel.

_____ 3. Two finishes used on tubs are white and colored enamel.

_____ 4. A shower diverter switches the flow of water from the tub to the shower head.

_____ 5. Both single- and double-handle faucets are used with bathtubs.

F. Select the true statement about water closets. Place a "✓" in the blank.

_____ 1. The two types of water closets are the washdown and syphon jet.

_____ 2. Most water closets are made of vitreous china.

_____ 3. Three types of floor seals are wax, plastic, and steel.

_____ 4. "Close coupled" and "one piece" are two types of water closets.

G. List three types of valves.

1. _____

2. _____

3. _____

H. List three types of bibbs and cocks.

a. _____

b. _____

c. _____

I. Identify the architectural plumbing symbols. Choose you answers from the list below and write it in the blank.

Roll rim tub

Angle tub

Water closet

Lavatory

Water heater

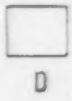
Drain

Hose bibb

Shower stall

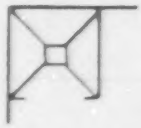
1. _____

2. _____




3. _____

4. _____



5. _____

6. _____

7. _____

8. _____

TEST PART 1

A. Match the terms with their definitions by placing the correct letter in the space at the left.

| | |
|---|---|
| _____ 1. Contractor | a. any fitting attached to a building (bathroom fixture, kitchen fixture) |
| _____ 2. Fixture | b. a person who agrees to do a job for another person |
| _____ 3. Journeyman Plumber | c. part used to join or adapt other parts, as on pipes (ell, tee, coupling, etc.) |
| _____ 4. Fitting | d. a person who installs repairs, replaces plumbing pipes, fittings, and fixtures |
| _____ 5. Plumber | e. self-employment |
| _____ 6. Entrepreneurship | f. a person who works for a master plumber |
| _____ 7. Inspector | g. a person who checks the plumbing work to see if it conforms to the plumbing code |

B. Write a short definition for each term listed below.

1. Estimator

2. Master Plumber

3. Apprentice Plumber

4. Counterperson

5. Salesperson

6. Foreman

C. What is a license?

D. Place a " ✓ " by the following statements that describe the duties of a plumber.

_____ 1. A plumber communicates with customers.

_____ 2. A plumber repairs or replaces broken plumbing.

_____ 3. A plumber installs new plumbing.

_____ 4. A plumber works for a company.

E. What does entrepreneurship mean?

F. What is an entrepreneur?

TEST PART 2

1. Explain safety as it applies to you in the following areas:

   a. Define safety (Circle the number of the correct answer.)

      (1) Freedom from machine trouble

      (2) Preventing accidents and injury

      (3) Looking around you

   b. The Occupational Safety and Health Act does which of the following? (Circle the number beside the correct answers.)

      (1) Provides medical help for the injured.

      (2) Assures every working person safe and healthful working conditions and safekeeping of human resources.

      (3) Organizes accident-prevention programs in school shops.

   c. General safety includes which of the following? (Circle the number beside the correct answers.)

      (1) Attitude

      (2) Personal safety

      (3) Group safety

      (4) Safety deposit box

      (5) Job safety

      (6) Clothing and equipment safety

      (7) Hand and power tool safety

2. Point out the importance of good safety attitudes by placing a "✓" in front of each correct statement.

   _____ a. The proper attitude is a must where each student will be working with hazardous equipment.

   _____ b. Most accidents are caused by other people.

   _____ c. Each student should be on guard against accidents at all times.

   _____ d. Visiting should be done during shop time because it keeps others alert.

3. Point out the correct personal safety rules to follow in the shop by placing the number of the correct answer in the blank provided:

_____ a. Clothing should fit

(1) loosely

(2) properly

(3) several sizes too small

_____ b. To keep hair from getting caught in moving parts, you should wear

(1) a ribbon

(2) an army helmet

(3) a cap

_____ c. When wearing long sleeves at your training station, you should

(1) roll them above your elbows

(2) cut them off at the shoulder

(3) leave the sleeves unbuttoned

_____ d. To protect your eyes, wear

(1) a cardboard shield with holes for your eyes

(2) regular eye glasses

(3) proper eye protection

_____ e. The best type of shoes to wear at work are

(1) tennis shoes

(2) beach shoes

(3) hard toed shoes

_____ f. You should wear gloves when

(1) operating machinery

(2) welding or handling sharp-edged metal

(3) measuring with precision instruments

4. Select the correct safety rules to be followed in the shop by answering T for True or F for False to each of the following statements.

_____ a. Wrestling, throwing objects, and general horseplay are fine activities.

_____ b. Observe all posted safety rules.

_____ c. Operate equipment without permission if you know how.

_____ d. Report only serious injuries.

_____ e. Know the location of fire extinguishers and exits.

_____ f. Rings, watches, and other jewelry are dangerous only when welding.

_____ g. Oily rags should be kept in a closed metal container.

_____ h. Spilled oil and grease should be spread evenly on the floor.

_____ i. Paint, thinner, and flammable materials should be placed in the center of the shop so they can air out.

_____ j. Do not run.

_____ k. Keep all machines and tools clean and in good working order.

_____ l. Use compressed air to clean machines of metal chips and cutting oil.

_____ m. Moving very heavy objects by yourself is good for building back muscles.

_____ n. Never operate a machine until all safeguards are in place.

_____ o. Have good ventilation when there is dust and fumes.

_____ p. Be alert at all times.

_____ q. Report damaged equipment only if it quits running.

TEST PART 3

1. Select the correct safety rules to follow when using hand tools by placing a "✓" in front of each correct statement.

_____ a. Focus your full attention on the work.

_____ b. Use the right tool for the right job.

_____ c. Learn how to use the tool properly.

_____ d. Keep tools in their best condition.

_____ e. Keep each tool in its place.

_____ f. When using sharp-edged tools, cut toward the body.

_____ g. Keep sharp-edged tools away from the edge of a bench or work area.

_____ h. Carry sharp-pointed tools with the cutting edge or point down.

_____ i. Keep tools repaired and clean.

_____ j. Never use a handle on a file.

_____ k. Do not strike hardened metal or tools with a hardfaced hammer.

_____ l. Avoid mushroomed or battered heads on metal tools by keeping them ground smooth and square.

2. Select the correct safety rules to follow when using power tools by answering T for True or F for False to each of the following.

_____ a. Be sure all power tools are <u>not</u> grounded.

_____ b. Power tools should be inspected and serviced regularly by qualified maintenance personnel.

_____ c. Read and understand all of the manufacturer's safety recommendations.

_____ d. Be familiar with the operation procedures of the tool.

_____ e. Inspect electrical cords to see that they are in good condition.

_____ f. Take safety guards off when they get in the way.

_____ g. Remove a tie, rings, or a wristwatch, and roll up long sleeves before using power tools.

_____ h. Be sure that your hands are dry.

_____ i. Make all adjustments and inspections with the power <u>OFF</u> and the cable <u>DISCONNECTED</u>.

_____ j. Before connecting to a power source, be sure that the switch is in the ON position.

_____ k. Wear safety goggles and a dust mask when you feel like it.

_____ l. Be sure that the materials being worked are securely clamped and will clear all machine parts when moving.

_____ m. Keep your attention focused on the work.

_____ n. Change in sound during power-tool operation normally indicates everything is working fine.

_____ o. When work is completed, shut off all power tools.

_____ p. When work is completed, the power tools should be left plugged in.

_____ q. After a tool is disconnected, remove blades, bits, or any other cutter from the tool.

_____ r. Store power tools and blades, bits, or other cutters in their proper places.

_____ s. When a power tool will not work right, remove it from service.

TEST PART 4

1. Select the correct rules associated with fire safety by answering T for True or F for False to each of the following.

_____ a. You should practice fire prevention.

_____ b. To know what type materials are burning in a fire is not important to the person putting out the fire.

_____ c. Give a fire the chance to go out on its own before reporting it.

_____ d. Know how to use a fire extinguisher.

_____ e. When you see a fire, the first thing to do is grab the closest fire extinguisher.

_____ f. Know the location of a fire alarm.

_____ g. Only doctors need to know how to treat burns.

_____ h. Keep the shop clean and flammables stored.

_____ i. Know how to leave a building during a fire.

_____ j. Fire drills are for fun.

2. Point out the class of fire according to the material burning by placing the correct number in the blanks.

_____ a. Flammable liquids, such as gasoline, paint, or oil

_____ b. Ordinary combustibles, such as wood, paper, or cloth

_____ c. Electrical equipment, such as motors, or switches

1. Class A
2. Class B
3. Class C

3. Point out the types of fire extinguishers and methods of use by writing the correct information from each of the lists below in the blanks provided.

| Classes of fires | To operate | Spray |
|---|---|---|
| A | Squeeze handle | At base of fire |
| B | Turn upside down | Over the fire |
| C | | |

| | Classes | To operate | Spray |
|---|---|---|---|
| a. Foam | _____ | _____ | _____ |

b. Carbon dioxide _____ _____ _____

c. Gas cartridge _____ _____ _____

d. Water _____ _____ _____

e. Dry chemical _____ _____ _____

4. Select the correct procedures for evacuating the building in case of a fire by answering T for True or F for False to each of the following.

_____ a. The doors and windows should be left open so that firemen may get to the fire easily.

_____ b. Make sure all the people are out of the building as you leave.

_____ c. Leave the building through the nearest window.

_____ d. Know the best route to take when leaving the building.

_____ e. Stand around close to the building during a fire to see if you can help.

5. Identify the different types of burns and the correct treatment of each by writing the information in the lists below in the correct blanks provided.

| | |
|---|---|
| Blistered skin | Get immediate medical help |
| Charred or seared skin | Apply cold water and sterile gauze |
| Reddened skin | Apply cold water |

| Burn | Appearance of skin | Treatment |
|---|---|---|
| a. Third degree..... | _____ ..... | _____ |
| b. Second degree..... | _____ ..... | _____ |
| c. First degree..... | _____ ..... | _____ |

PLUMBER'S HELPER

TEST PART 5

1. Match the plumbing terms in the right hand column to the correct definition on the left. Place the number in the blank.

| | | |
|---|---|---|
| _____ a. | Outside diameter | 1. I.D. |
| _____ b. | Pounds per square inch | 2. O.D. |
| _____ c. | Iron Pipe Thread | 3. I.P.T. |
| _____ d. | Inside diameter | 4. P.S.I. |
| _____ e. | Rough edge on end of pipe | 5. burr |
| _____ f. | Combine with oxygen | 6. male end |
| _____ g. | Mildly corrosive acid used to clean surface to be soldered | 7. female end |
| _____ h. | End of pipe having outside threads | 8. oxidize |
| _____ i. | End of pipe having inside threads | 9. solder flux |

2. Identify the types of standard steel pipe below. Place a "✓" in blank beside each of the correct types.

_____ a. Galvanized

_____ b. Brown

_____ c. Black

_____ d. Coated

3. Select the true statements about sizes of standard steel pipe. Place a "✓" in the blank.

_____ a. Measured by inside diameter

_____ b. Measured by outside diameter

_____ c. Sizes range from 1/8 inch to 10 inches I.D.

_____ d. Steel pipe is manufactured in only one length

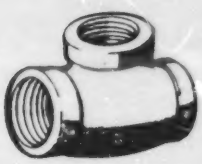
_____ e. Lengths are usually threaded on both ends

4. Identify the pipe fittings. Write the name of each in the blank. Select your answer from the list below.

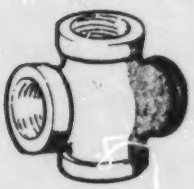
| | |
|---|---|
| 90° elbow | Cross |
| Tee | Coupling |
| Union | Reducer |
| Plug | Cap |

a. _____

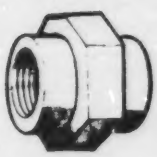
e. _____



b. _____



f. _____



c. _____

g. _____

d. _____

h. _____

5. List three methods of pipe measurement.

a. _____

b. _____

c. _____

6. Determine which of the statements are true about threads and threading. Place a "✓" in the blank.

_____ a. Threads provide a water tight seal at connections

_____ b. Threads provide a strong holding connection

_____ c. Pipe threads are straight

_____ d. American Standard Thread is the standard pipe thread

7. List three tools or materials used when working with steel pipe.

a. _____

b. _____

c. _____

8. Identify the types of copper tubing. Place a "✓" in the blank beside the correct types.

_____ a. Type M

_____ b. Type K

_____ c. Type L

_____ d. Type A

_____ e. Type C

9. Select the types of fittings used on copper tubing. Place a "✓" in the blank.

_____ a. Sweat solder joint

_____ b. Flare

_____ c. Retention

_____ d. Compression

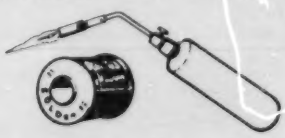
10. Identify the tools used on copper tubing. Select answer from the list below. Write your answer in the blank.

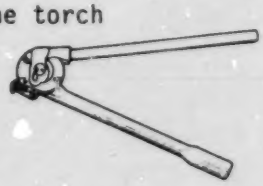
Tubing cutter

Tubing bender

Flaring tool

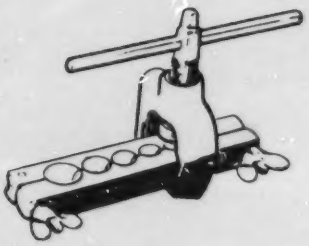
Propane torch





a. _____

b. _____



c. _____ d. _____

11. List three tools used in plumbing.

a. _____

b. _____

c. _____

TEST PART 6

1. Match the terms in the right hand column to the correct definition on the left. Place the number in the blank.

| | | |
|---|---|---|
| _____ a. | End of pipe has a coupling attached | 1. PVC |
| _____ b. | Easy to bend | 2. CPVC |
| _____ c. | Not to be bent | 3. HWP |
| _____ d. | A straight end with no bell or coupling | 4. insert |
| _____ e. | Plastic pipe suitable for hot or cold liquids | 5. rigid |
| _____ f. | Hot water pipe | 6. brittle |
| _____ g. | Plastic pipe | 7. flexible |
| _____ h. | End has been enlarged to serve as a coupling | 8. plain end |
| _____ i. | Place inside | 9. belled end |
| _____ j. | Easily cracked or broken | 10. coupled end |

2. List four types of plastic pipe and fitting.

a.

b.

c.

d.

3. Select the correct statements about joining plastic pipe. Place a " " in the blank.

_____ a. The letter "C" means the joint is to be glued.

_____ b. The letter "T" means the joint is to be cemented.

_____ c. The letters "CT" mean the PVC fitting is glued on one end and threaded on the other.

_____ d. Insert fittings are made of metal only.

_____ e. Straps should be used to support PVC pipe every 48 inches.

4. Identify the correct types of PVC cements and cleaners. Place a " ✓" in the blank.

_____ a. Clear fast set PVC cement

_____ b. CPVC cement

_____ c. HVPC cement

_____ d. Universal cleaner

5. Select the correct statements about precautions of plastic pipe. Place a " ✓" in the blank.

_____ a. Plastic pipe may be used to carry explosive gases or liquids under a concrete slab.

_____ b. Plastic pipe should be insulated if it is exposed to extreme cold.

_____ c. All PVC cements and cleaners are used in the same manner.

_____ d. Use the type of cement and cleaner recommended by the manufacturer.

## TEST PART 7

1. Match the terms in the right hand column to the correct definition on the left. Place the number in the blank.

| | | |
|---|---|---|
| _____ a. | Bell shaped joint on end of cast iron pipe | 1. Packing |
| _____ b. | Metal used to make a seal on cast iron joint | 2. Main |
| _____ c. | A seal made at the joint of cast iron or clay pipe | 3. Lead |
| _____ d. | Jute treated in tar and used for packing | 4. Oakum |
| _____ e. | Drain, Waste, Vent | 5. Hub |
| _____ f. | Large sewer, water, or gas pipe serving many houses | 6. DWV |
| _____ g. | Plain end of pipe usually not threaded | 7. Spigot |
| _____ h. | Holes punched in a regular pattern | 8. Perforated |

2. List four types of DWV pipe.

   a. _____

   b. _____

   c. _____

   d. _____

3. Identify the correct statements about cast iron pipe. Place a "✓" in the blank.

   _____ a. Single hub or double hub

   _____ b. 20-foot lengths

   _____ c. Used for high pressure lines

   _____ d. Joined with oakum and lead

   _____ e. High quality and durability

   _____ f. Used under slabs

4. List two materials used to make a joint on clay pipe.

   a. _____

   b. _____

5. Select the true statements about plastic DWV pipe. Place a "✓" in the blank.

   _____ a. Lengths up to 20 feet

_____ b. Used to carry explosive gases under pressure

_____ c. Perforated plastic DWV is used for lateral lines

_____ d. Expensive and highest quality

_____ e. Joined with melted lead

6. Identify the correct statements about galvanized steel pipe. Place a " ✓" in the blank.

_____ a. Galvanized DWV pipe is the same as galvanized water pipe

_____ b. Joints are made with threaded, black or galvanized cast fittings

7. Identify the pipe fittings. Choose your answer from the list below. Write your answer in the blank.

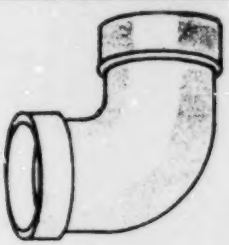
P-trap

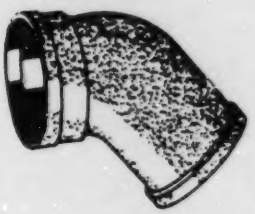
90° bend

Sanitary tee

45° 1/8 bend

a. _____ b. _____





c. _____ d. _____

8. List five tools used to join cast iron pipe.

a. _____

b. _____

c. _____

d. _____

e. _____

PLUMBER'S HELPER

TEST PART 8

1. Match the terms in the right hand column to the correct definitions on the left. Place the number in the blank.

| | | |
|---|---|---|
| _____ a. | Patent overflow plug | 1. valve |
| _____ b. | A device used to control the flow of gas or liquid | 2. fixture |
| _____ c. | A type of valve | 3. P.O. plug |
| _____ d. | Something built into place for a specific use | 4. diverter |
| _____ e. | A faucet with a bent-over spout | 5. water closet |
| _____ f. | Glassy, slick surface | 6. vitreous |
| _____ g. | Bathroom commode | 7. bibb |
| _____ h. | The length is greater than the width | 8. faucet |
| _____ i. | A device that switches the direction of flow | 9. enamel |
| _____ j. | Baked on finish that gives a glossy appearance | 10. elongated |

2. Select the true statements about kitchen sinks. Place a "✓" in the blank.

_____ a. The two types of kitchen sinks are the single and double compartment.

_____ b. The three most common materials used to make sinks are vitreous china, cast iron, and lead.

_____ c. Three kinds of finishes on sinks are stainless steel, white enamel, and colored enamel.

_____ d. Deck, wall, and dish spray are three types of faucets.

_____ e. A sanitary tee is used to connect the sink water supply.

3. Select the true statements about bathroom lavatories by placing a "✓" in the blank.

_____ a. There are only round and rectangular shaped lavatories.

_____ b. The two types of lavatories are countertop and wall-hung.

_____ c. The two types of wall-hung lavatories are ledge back and flat back.

_____ d. The materials lavatories are made of are vitreous china, pressed steel, and lead.

_____ e. The two types of faucets used on lavatories are single handle and double handle.

4. List three types of hangers used to support sinks and lavatories.

a. _____

b. _____

c. _____

5. Select the true statements about bathtubs. Place a "✓" in the blank.

_____ a. The three types of tubs are recess, corner, and freestanding.

_____ b. The two types of materials used to make tubs are cast iron and steel.

_____ c. Two finishes used on tubs are white and colored enamel.

_____ d. A shower diverter switches the flow of water from the tub to the shower head.

_____ e. Both single and double handle faucets are used with bathtub.

6. Select the true statement about water closets. Place a "✓" in the blank.

_____ a. The two types of water closets are the washdown and syphon jet.

_____ b. Most water closets are made of vitreous china.

_____ c. Three types of floor seals are wax, plastic, and steel.

_____ d. "Close coupled" and "one piece" are two types of water closets.

7. List three types of valves.

a. _____

b. _____

c. _____

8. List three types of bibbs and cocks.

a. _____

b. _____

c. _____

9. Identify the architectural plumbing symbols. Choose your answers from the list below and write it in the blank.

Roll rim tub

Angle tub

Water closet

Lavatory

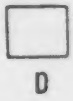
Water heater

Drain

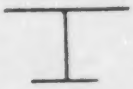
Hose bibb

Shower stall

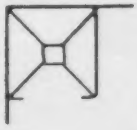
a. _____



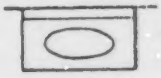
b. _____



c. _____



d. _____



e. _____

f. _____

g. _____

h. _____